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THE

# NATURALIST:

A  
MONTHLY JOURNAL OF  
NATURAL HISTORY FOR THE NORTH OF ENGLAND

EDITED BY  
THOMAS SHEPPARD, F.G.S., F.S.A. Scot.

CURATOR OF THE MUNICIPAL MUSEUMS, HULL.

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GEOLOGICAL SOCIETY; HON. SECRETARY OF THE YORKSHIRE NATURALISTS'  
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WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF

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JOHN W. TAYLOR.

T. H. NELSON. M.B.O.U.

WILLIAM WEST, F.L.S.

RILEY FORTUNE, F.Z.S.

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1909.

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# THE NATURALIST

## FOR 1909.

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### NOTES AND COMMENTS.

#### LINCOLNSHIRE NATURALISTS.

THE annual meeting of the Lincolnshire Naturalists' Union was held at Lincoln on December 3rd. There are 112 members in the Union. The Rev. E. A. Woodruffe Peacock presented 60,000 notes on the Flora of Lincolnshire, and it was decided to have them published. The Rev. A. Hunt read a paper on 'Pre-historic Man in Lincolnshire.' In this he said it was 'possible to reconcile the teachings of scientific results with the scriptural narratives. There was a Bronze Age in the Bible . . . Bronze (translated brass in the Pentateuch) was mentioned forty-five times. Iron was only mentioned four times.' Mr. W. Denison Roebuck, of Leeds, was elected president for 1909.

#### DR. W. E. HOYLE.

We should like to sincerely congratulate Dr. W. E. Hoyle, of the Manchester Museum, on his appointment as Director of the new Welsh National Museum at Cardiff. Dr. Hoyle's excellent work at the Owen's College Museum is well known, and the collections under his charge have long been looked upon by his confrères with envy. Dr. Hoyle has also taken a keen and practical interest in the work of the many Manchester scientific societies, and, consequently his departure will be much regretted. At the Leicester meeting of the British Association he was the President of the Section for Zoology, and gave an admirable address on the classification of the Cephalopoda, a subject he has made a special study.

#### NORWICH MUSEUM ASSOCIATION.

We have received the First Annual Report of Proceedings of the Norwich Museum Association, founded in 1907 for the object of extending the sphere of usefulness of the Norwich Museum. A series of lectures has been given on such subjects as 'The food of birds,'; 'The House-fly, etc., and other insects as carriers of disease'; 'Some Fungoid Diseases of Plants'; 'The Nature and Properties of Soils,' etc., etc. These are given by specialists, and have been well attended, and much appreciated.

## MUSEUM CONFERENCE AT ROCHDALE.

A Conference of Museum Curators was held at Rochdale recently, representatives being present from Accrington, Blackburn, Bolton, Bootle, Bury, Hull, Keighley, Liverpool, Manchester, Sheffield, Stockport and Warrington. The Museum and Art Gallery are of recent erection—the former being small. It contains, however, representative collections of local geological and archæological objects. Papers and exhibitions of interest to Curators were brought forward by Dr. W. E. Hoyle, Messrs. W.-S. Laverock, S. L. Mosley, R. Bateman and F. Williamson. Lieutenant-Colonel Fishwick, the Chairman of the Rochdale Museum Committee, entertained the visitors.

## LIVERPOOL BIOLOGISTS.

The Liverpool Biological Society has again earned the gratitude of all naturalists by publishing so excellent a volume of Proceedings and Transactions as that just issued for 1907-8.\* Besides a review of the work of the Society during the year, it contains the Presidential Address of Mr. W. T. Haydon, on 'The Seed Production of *Pinus sylvestris*'; 'The Twenty-first Annual Report of the Liverpool Biological Committee and their Biological Station at Port Erin'; a marvellous record of detailed and systematic work, by Prof. Herdman; a 'Report on the Investigations carried on during 1907, in connection with the Lancashire Sea-fisheries' laboratory, at the University of Liverpool, and the Sea-Fish Hatchery at Piel, near Barrow,' by Prof. Herdman and Messrs. A. Scott and J. Johnstone—a report of two hundred pages; and Mr. W. J. Dakin writes on 'Methods of Plankton Research.'

## 'CANCER.'

An unusually valuable feature in this volume is the Monograph on Cancer—the Edible Crab, by Mr. Joseph Pearson, which forms No. 16 of the Liverpool Marine Biological Committee's Memoirs—a series indispensable to the working zoologist. In this monograph, which contains over two hundred pages, and numerous beautifully prepared plates, is presented an account of the Edible Crab, which may be safely said to contain all that is at present known of the physiology and anatomy of the species. We heartily congratulate the Liverpool Society and Mr. Pearson on its production.

---

\* Vol. XXII., 1908. 554 + xviii. pp., and plates.

## 'GRANNY' CRABS.

An interesting item of information is given with regard to certain worn and dilapidated crabs, known as 'grannies,' which are caught in abundance during July and August. These are not necessarily old nor female, but they are promptly killed, and thrown into the sea again by the fishermen. These crabs are unsaleable, and are said to have a strong bitter taste. It is considered, however, that these particular crabs are merely individuals which are approaching the time when in every second year, a crab this size will cast its skin. The probability is therefore that instead of being harmful, and likely to 'infect' their neighbours, they would, if left alone, cast their shells, and, after passing through a period as 'soft' crabs, again be normal, clean-looking healthy individuals, suitable for the market. Unless stopped, it is probable that much harm will be done to the local crab fisheries by the wholesale slaughter of the 'grannies.'

## CUMBERLAND INTRUSIVE ROCKS.

At a recent meeting of the Geological Society of London, Dr. A. R. Derryhouse read a paper 'On some Intrusive Rocks in the Neighbourhood of Eskdale, Cumberland,' In this he pointed out that there appear to be five well-marked groups of intrusions in this district:—(a) The andesitic dykes in the neighbourhood of Allen Crag and Angle Tarn; (b) The dykes of the spherulitic and felsitic group on Yewbarrow and High Fell; (c) The dioritic ('bastard granite') bosses of Peers Gill, Lingmell Crag, and Bursting Knotts, with their associated dykes; (d) The Eskdale Granite, with the granite-porphry dyke running from Great Bank to Wasdale Head, and thence to Kirkfell Crag; and (e) The dolerite dykes, having a general north-west to south-east trend.

The dykes of series (a) bear a very strong petrological resemblance to the Borrowdale volcanic rocks, into which they were intruded. Furthermore, they are weathered to much the same extent and have developed the same secondary minerals, among which epidote is conspicuous. They appear to be of Borrowdale age, and roughly contemporaneous with the lavas and ashes into which they are intruded. The spherulitic and more acid series (b) are considered to be also of Borrowdale age, though probably somewhat later than the andesitic series. The rocks of the dioritic group (c) are considered to be the

holocrystalline and hypabyssal equivalents of the Borrowdale Lavas, and the author is of opinion that they also are of Ordovician age.

#### ESKDALE AND WASDALE GRANITE.

The Eskdale and Wasdale Granites (*d*) are much more acid, and show little sign of alteration, except that due to weathering and dislocation. They are undoubtedly intrusive into the Borrowdale Series, but seems to be pre-Triassic. Thus the intrusion is probably Devonian, like the neighbouring granite of Shap, which, with the exception of its large phenocrysts of orthoclase, is not dissimilar to some of the varieties of the Eskdale Granite. The basic intrusions (*e*) have been examined only where they come into proximity to the granite. They may well be connected with the great Tertiary basic flows of Antrim, as has been suggested by Mr. Harker. The granite becomes progressively more and more acid as its margin is approached, until, in some places, the percentage of silica amounts to 96.16. This is explained by the assumption that the magma, as a whole, was more acid than the eutectic mixture of quartz and orthoclase, and that consequently the excess of silica separated in the marginal portions, which were the first to solidify.

#### GEOLOGY OF HARROGATE.

A second edition of the "Geology of the Country north and east of Harrogate," prepared by Mr. C. Fox-Strangways, has just been published by the Survey, and we should like to congratulate both the Survey and Mr. Fox-Strangways upon the general excellence of the work. It is also illustrated in a way which is quite refreshing for a government publication—the reproductions of photographs by Mr. Godfrey Bingley being very fine indeed. There is also a coloured geological map of the district.

After dealing in detail with the various beds in the area, there are chapters on the physical structure, economic geology, the Harrogate springs, etc., the last being of particular value. There are appendices devoted to well-sections and bibliography, both of which are carefully compiled, and unusually complete.

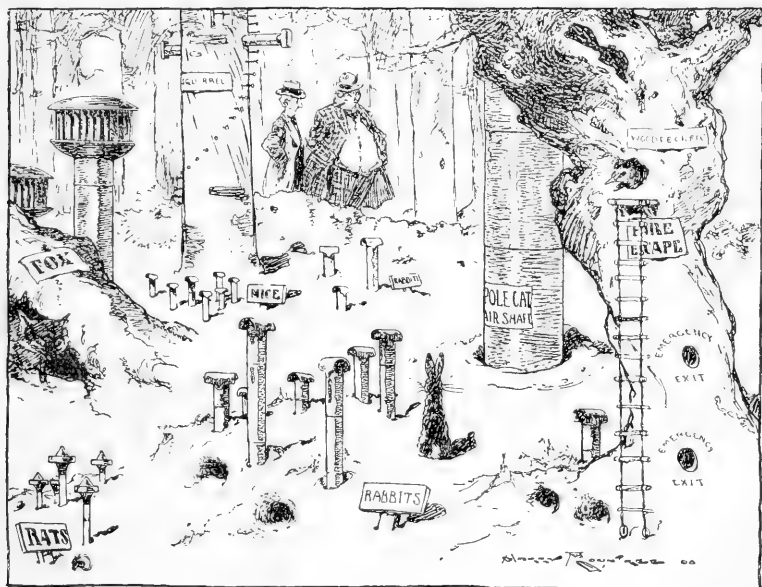
#### YORKSHIRE ZOOLOGISTS.

The Vertebrate Section of the Yorkshire Naturalists' Union, recently held a most successful meeting at Leeds, which extended from early in the afternoon until late in the evening. Mr. Riley

Fortune presided. The papers and lantern exhibitions, enumerated on the cover of the 'Naturalist' for December, were given, and much of the valuable information brought forward will be permanently recorded in the pages of this journal. Reports of the year's work of the Vertebrate Section and of the Wild Birds' and Eggs' Protection Committee were also presented; Mr. W. H. St. Quintin, the Chairman of the latter, being present. These reports are being printed in the 'Transactions of the Yorkshire Naturalists' Union.' The next meeting of the Section will be held at Leeds on February 13th.

#### OUR DUMB FRIENDS.

Having regard to the care now being taken of our dumb friends, we notice our contemporary, 'Punch,' in the accompanying sketch, draws attention to the possible extremes which may be reached.



[Reproduced by the special permission of the Proprietors of 'Punch'].

#### Hygiene for our Dumb Friends.

*Harassed Landowner.* "I can't understand why you complain. I've put in all the air-shafts, fire-escapes, emergency exits, etc., that you require."

*Urban Sanitary Inspector.* "But, my dear Sir, where is the provision for the Great Auk, should that bird elect to settle on your land."

## YORKSHIRE NATURALISTS AT DONCASTER.

THE forty-seventh Annual Meeting of the Yorkshire Naturalists' Union was held at Doncaster, on December 10th. Partly on account of the wretched weather which prevailed, and no doubt partly on account of the meeting being held on a Thursday, the attendance was not what has been experienced in recent years; nevertheless, there was a goodly number present, and the Doncaster Scientific Society did its best to look after the interests of the visitors. The meetings were held in an excellent suite of rooms in the Mansion House, kindly lent by the Doncaster Corporation.

In the morning an excursion was held to Cusworth; where, nothing daunted by the elements, an enthusiastic if small party had a very profitable outing, and many interesting fungi and other specimens were shewn at the *Conversazione* as a result.

The various sections of the Union had representative meetings in the afternoon, at which the reports were adopted and officers for 1909 were elected. At the meeting of the General Committee, the Executive's Report on the year's working was presented, and, together with the financial statement, proved very satisfactory. It was shewn that in each of the Union's Sections and Committees, work of a valuable character had been carried out, thus making the Report a useful record of natural history observations in the county during the year. The Report was, perhaps, the most complete and most satisfactory that has ever been issued in the nearly half a century of the Union's existence.

The Excursions for 1909 were arranged as under:—

York, S.E., Market Weighton, Saturday, May 8th.

„ Mid-W., Bowland, Whit week-end, May 31st to June 2nd.

„ N.E., Runswick, Saturday, July 3rd.

„ N.W., Sedbergh, August Bank Holiday week-end, 2nd to 4th.

„ S.W., Cawthorne, Saturday, August 21st.

The Annual Fungus Foray will be held at Castle Howard, September 18th to 23rd.

The Annual Meeting for 1909 will be held at Scarborough, in December, and the members of the Scarborough Field Naturalists' Society have kindly invited the Union to be their guests.

The officers elected for 1909 were:—*President*, Mr. W. H. St. Quintin, J.P., M.B.O.U., Rillington; *Treasurer*, Mr. H.



Culpin, Doncaster ; *Hon. Secretary*, Mr. T. Sheppard, Museum Hull.

The evening meeting was largely attended, and Mr. H. H. Corbett, the President of the Doncaster Scientific Society, was in the chair. Dr. Wheelton Hind delivered his Presidential Address, entitled 'On the Present Position of the Geology of the Carboniferous Rocks of Great Britain,'\*—a most appropriate subject in view of the interest now being taken in the Carboniferous Series by many members of the Union, and also having regard to the part probably shortly to be played by Doncaster in reference to the output of coal.

In his introductory remarks, Dr. Hind stated:—'The honour done me in electing me as President of the Yorkshire Naturalists' Union is one which I can assure you I have appreciated most highly, my only feeling is one of regret that I have not been able to attend the meetings and excursions of the Society. When I accepted the position, I fully intended to do my duty, and to take a part in the excursions, but many causes have prevented my good intentions being fulfilled. I must thank most cordially those who proposed and elected me to the proud and important position of your President, and I am proud to feel that this honour is an appreciation of whatever little work I have been able to accomplish in the geology of the Carboniferous rocks and their fossils.

'I cannot pass to the subject matter' of my address without alluding to the great loss which the world of science, and this Society in particular, has suffered in the death of Henry Clifton Sorby. It is not given to every one to establish a new department in science, or to attain the age of eighty-two with a brain capable of the highest scientific work; and fate was kind in sparing his to science for so long. The science of Petrology will be his lasting monument.'

A *Conversazione* was subsequently held in the large room at the Mansion House, at which was an excellent series of microscopes, and geological, botanical, and other specimens, many of extreme interest. Refreshments were also provided by the Doncaster Society.

Votes of thanks were passed to the Doncaster Society and the Corporation for their entertainment, and for the use of the rooms.

T. S.

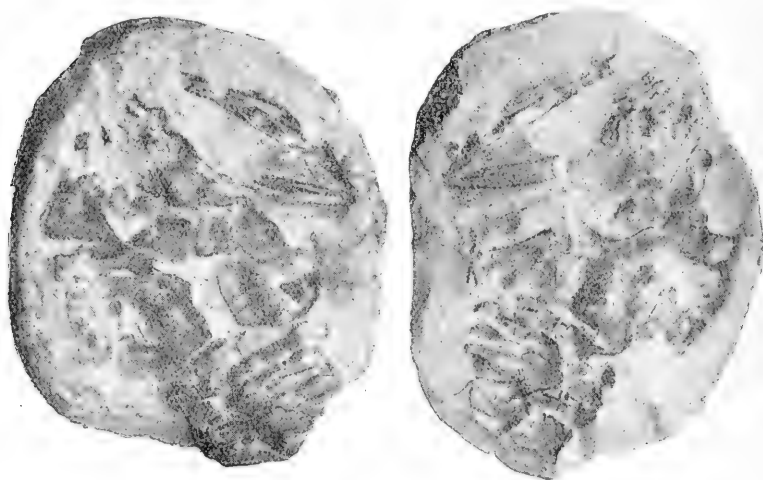
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\* This will be published shortly in these pages.

## ON A SPECIMEN OF *ERYON ANTIQUUS* BRODERIP, FROM THE YORKSHIRE LIAS.

T. SHEPPARD, F.G.S., F.S.A.Scot.  
Hull.

Mr. A. M. Murley has handed to me a glacially striated nodule from the Boulder Clay at Waxholme, East Yorkshire, measuring  $4\frac{1}{2}$  inches by  $3\frac{1}{4}$  inches. This has been split, and reveals an excellent impression of a Crustacean, which Dr. Bather kindly identifies as '*Eryon (Coleia) cf. antiquus* Broderip, or a closely allied form.' The nodule is presumably derived from the Lower Lias of the Yorkshire Coast, from which horizon in other



parts of Britain this species has been recorded, though this appears to be the first example from Yorkshire. The half of the nodule containing the specimen shows the carapace, abdomen, and one large chelate thoracic leg. The lower part of the abdomen is bent under the body; the tail-fan, if present, being hidden in the nodule.

The total length of the specimen is 10.5 centimetres. The carapace is about six centimetres wide, though the state of the specimen prevents a definite measurement. The hinder border of the cephalothorax is fairly concave forwards. At a distance of four centimetres from the posterior border, there is a triangular indentation, though the small tooth-like spine, described by Dr. Woodward as occurring on a specimen from

Lyme Regis,\* is not well indicated on the Yorkshire example. At a distance of 4.5 centimetres occurs a second indentation called the cervical notch by Dr. Woodward, extending into the carapace to the extent of 1.25 centimetres. The carapace in front of this is coarsely tuberculated, and its edge is serrated.

In front of the carapace are the impressions of two antennules; the antennules themselves, to the length of nearly a centimetre, (together with the greater portion of the right claw, etc.), occur in the upper portion of the nodule, and clearly indicate their segmented character.

Unfortunately in the Yorkshire specimen, the smaller thoracic legs are not shown. As in the Lyme Regis example, described by Dr. Woodward, however, it possesses only one of the first pair of chelate thoracic legs, the comparative length of which is such a distinctive feature of *E. antiquus*. The total length of the example preserved in the nodule now being described, is 8.25 centimetres. The abdomen, so far as it is exposed, measures 4.25 centimetres. Its widest part appears to be at the first segment, which is slightly over 4 centimetres across. The extremities of this are curved, are better exposed than the other segments, and clearly shew the points of attachment of the legs. Each segment, which is coarsely granular, bears a well-defined keel on the centre of its tergal arch. In the nodule, to the left of the first segment, is a small claw, evidently belonging to one of the smaller legs.

As already explained, the tail-lobes or swimmerets are not exposed.

The surface of the carapace is strongly granulated. The central or dorsal line is marked by a ridge or keel, in addition to which two rounded ridges further sub-divide the carapace longitudinally.

Various species of *Eryon* are recorded from the well-known Solenhofen Limestone, and have been described by Spence-Bate.† That writer draws attention to the rarity with which the eyes are found in these fossil forms, and Dr. Woodward also emphasises the point, though he refers to one or two instances in which the eye occurs. In the specimen now being described, however, the left eye is exceptionally well shown,

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\* On *Eryon antiquus* Broderip sp. from the Lower Lias, Lyme Regis, Dorset. Geol. Mag., Oct. 1888, pp. 433-441. See also Q. J.G.S., 1866, pp. 494-502.

† Geol. Mag., 1884, p. 307.

and is a prominent globular mass, 4 millimetres in diameter. The opposite side of the front of the carapace clearly shows the position formerly occupied by the right eye.

Dr. Woodward's paper is illustrated by examples of modern representatives of this ancient family of Jurassic Crustaceans, which were secured during the 'Challenger' Expedition, and to which reference should be made.

The lower part of the nodule containing the crustacean, is in the collection of Mr. A. M. Murley, of Hull. The upper part of the nodule which contains the antennules, the complete claw, or first chelate thoracic leg, and portions of the segments of the abdomen, as well as an excellent impression of the fossil in his possession, he has kindly given to the Hull Museum.

---

**Hazell's Annual for 1909.** London: Hazell, Watson & Viney, Ltd., 3/6 net. This volume appears at a most opportune time, coming at the close of a year which has been fruitful of change, new legislation, and the rapid development of science and invention. It will prove of very great service to everyone who desires to keep in touch with current events. The busy man to-day has not the time to turn up the many books of reference to get the latest information on given subjects. 'Hazell's Annual' for 1909, furnished as it is with a complete reference index, enables the reader to turn up in a moment the latest information on almost every topic of current interest. In this volume he will find such articles as 'Housing and Town Planning,' 'Parliamentary Session,' 'Slump in Trade,' 'Religious Review of the Year,' 'The Unemployed Problem,' 'The Conquest of the Air,' and many other important topics. The review of scientific progress in 1908 is particularly welcome. The Editor is Mr. William Palmer, who is to be congratulated upon his new volume.

**The Changeling.** A Nature Story for Boys and Girls, by Sir Digby Pigott, C.B. London: Witherby & Co. 183 pp., 2/6 net.

The sub-title of this little book—'What a boy whose eyes had been opened, saw of the real life of the wild creatures round his home,' explains its scope. There are a dozen chatty chapters dealing with 'The Bees,' 'The Rooks,' 'The Cliff Climbers,' 'The Wild Geese,' 'The Mammoth,' etc., and numerous illustrations (some coloured), by the author and C. Tresidder, add further interest to the book. The story has reference to a boy whom the fairies changed, and enabled him to get an insight into the ways of the birds, and mice, and foxes. On one of his travels he took part in the cliff-climbing on Flamborough Head, of which operation a sketch is given, which looks suspiciously like a well-known picture-postcard view of these 'gallant men' of Bempton. And 'Tommy' was particularly lucky when he went to Flamborough, as in the first haul of 'many as good made that day there were a few cormorant's eggs, a clutch of three greenish blotched kittiwake's eggs, and a couple of razor-bill's . . . But nine out of ten were pear-shaped guillemot's eggs.' A good haul indeed, so good, that we wonder if Tommy really was there after all!

**Guide to the Town of Brandon,** and the oldest Industry in Britain, by W. G. Clarke. W. Broughton & Sons, Thetford, 46 pp., 6d.

This is so well written, printed and illustrated, that it is a pleasure to possess it. The author is well known for his work amongst the pre-historic weapons of Norfolk, and his description of the well-known flint-knapping industry is full of interesting detail. The guide is well illustrated, and very cheap at sixpence.

## ON THE STATUS OF THE STONE CURLEW IN YORKSHIRE.\*

E. W. WADE, M.B.O.U.

IF scarcity be the touchstone of our interest in any bird, then surely the Stone Curlew is the most interesting resident species in Yorkshire, the northern limit of its breeding range in Britain.

Some 150 years ago, prior to the introduction of the present system of agriculture on the high wolds and waste lands of the county, when huge stretches of sandy warren and sheep-walk existed, the bird must have been as common as it still is in some parts of Norfolk and Suffolk, but at the present day it is almost extinct in our county. This change of conditions may be traced to the introduction of the turnip, by which alone the present rotation of crops became possible.

About the middle of the seventeenth century, the turnip began to be used in agriculture, but it was not till after 1760, when the growing demand for farm produce, owing to the increase of population and wealth from manufactures; began to have its effect upon prices, that the poorer soils were taken into cultivation. This movement reached its culminating point in the years 1795-1814, at the period of famine prices produced by the wars following the French Revolution, during which the enclosure of the wolds was carried on in earnest; and soils, which previously were thought too poor to pay for cultivation, were brought under the plough. The present order of rotation of crops on the wolds is :—

- 1.—Turnips.
- 2.—Barley.
- 3.—Seeds, *e.g.*, Clover, Ryegrass, Sanfoin.
- 4.—Oats.

Sir Mark Sykes, the father of the present Baronet, played a great part in this movement. There are old men still living on the wolds who can remember the ploughing up of some of the warrens, which they date sixty-three years back, and garnish their tale with stories of poaching escapades of the old days, and the last of such lands devoted to the cultivation of the rabbit was broken up within the last ten years only. The father of Ned Hodgson, of Bempton, lived at a time when open

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\* Read at a recent meeting of the Vertebrate Section of the Yorkshire Naturalists' Union.

warren existed between that place and Bempton, land covered with the whins, coarse grass and short heather, typical of the old sheep-walks.

Whereas then, 150 years ago, cultivation was carried on in the valleys only, and the high wolds and poorer soils were devoted to warren and sheep-walk, now, every acre of land that can be made to produce anything under the plough is cultivated. To a bird like the Stone Curlew, a lover of waste places and open country, this enclosure has meant gradual extinction. The records of the status of the bird in Yorkshire are but scanty; for, unlike the Great Bustard, which it closely resembles in habits, it is not a sporting bird, and therefore no one thought it worth while keeping a record of the species. I think we may safely take it, however, that it ran on all fours with its large relative, and that Mr. Nelson's excellent account of the Great Bustard in "*Birds of Yorkshire*," will also give us the best picture of the history of the Stone Curlew in our county. Doubtless it bred extensively on the plains of York, where patches of scanty heather and uncultivated land here and there are the only remaining traces of the sandy wastes formerly existing, but we have no record of any of these, except Tollingham Moor and Cliffe Warren, situated on either side of the Market Weighton Canal, some four or five miles south-east of Market Weighton, and between Cliffe and Holme-on-Spalding Moor, on the borders of what was once the great Wallingfen.

Tollingham Moor, named by Dresser as a breeding place of the species, was ploughed up previous to the sixties, but upon Cliffe Warren, up to 1873, the species was well known to residents; one of whom, Mr. Jno. Reynolds, now living at South Cliffe, can remember seven or eight pairs breeding near there, and still describes the wary nature of the bird, which would run from the eggs with head depressed, skulking behind each tuft of herbage, for one hundred yards, before taking to flight. Eggs taken from here were in the collection of the late Mr. N. F. Dobrée, of Beverley, and are still in that of Mr. F. Boyes, taken in the period 1868 to 1873. Mr. Boyes yet speaks with pleasure of listening to the wild musical cry of the bird, when it flew from the warren to its feeding ground in the evening. On the warrens of Lincolnshire—Brumby, Risby, Manton, etc., the bird bred in precisely similar localities till recent years, and an odd pair may perhaps linger there still, unless the march

of civilization has wiped it out. Here my first study of its habits commenced.

These, however, are memories of the past. Turning to the present, there are but two localities where the Stone Curlew persists in Yorkshire as a breeding species, viz., one in the North Riding and the other on the Yorkshire Wolds.

Of the former, Mr. Oxley Grabham wrote in the 'Naturalist' for September 1897, with a photograph of 'the eggs of one of the last two or three remaining pairs of the bird which breed in Yorkshire.' The locality is an open secret in the North Riding, and to my certain knowledge, eggs have been 'lifted' there more than once in recent years, but happily the birds have increased, as Mr. Riley Fortune reported at the Yorkshire Naturalists' Union Protection Meeting on November 21st, 1908, that five pairs bred there this year, and another pair in a locality close at hand.

The second breeding place and last stronghold of the Yorkshire Stone Curlew is the Yorkshire Wolds, an entirely different ground from the flat, sandy warrens named previously. Rising in a series of gentle undulations from the plain of Holderness, on their Eastern border, the Wolds attain their greatest elevation on the west, north-west, and north edges, where they drop suddenly into the Plain of York, the Vale of Pickering, and the sea at Bempton Cliffs. Traces of their former wildness remain, in the valleys carved out by ice, and showing sometimes sides almost as cleanly cut as when the glaciers left them; in the patches of thin soil here and there, too barren even for modern agriculture to tackle, occasionally in land given over to scanty heather, coarse grass, and whin bushes, the covering of the old sheep-walks. But for our present purpose, their most salient feature is the broad sweeps of open country, fields of one hundred acres or more, covered with a soil largely composed of chalk and flints, out of sight of the villages, which, as a rule, nestle in secluded hollows. Here the Stone Curlew finds skulking ground enough, harmonising with his own, inconspicuous plumage, and space where his quick eye detects the approach of an enemy afar off, and gives him opportunity to escape destruction. Here, in out-of-the-way corners, scattered in odd pairs wherever it can escape persecution, the bird leads a precarious existence.

In the 'Birds of Yorkshire,' mention is made of forty birds being seen in a flock at Ganton in October 1874. The greatest

number seen together of which I can obtain any record in present times is eight, on 4th April, 1907, in a locality which shall be nameless, an earlier date than I can find any mention of either in Stevenson's 'Birds of Norfolk' or the 'Birds of Yorkshire.' Probably when flocking for the autumn migration, more might be observed if any record could be obtained. The birds soon separate, and each pair scatters to its own breeding ground, which is generally pretty near the same locality each year. The persistence of the Stone Curlew in returning to its old haunts was well illustrated on Brumby Warren in Lincolnshire, a favourite breeding place before the extension of the blast furnaces. Here, although footpaths were made through its favourite haunts, and its eggs were persistently robbed, it continued to struggle on for some years, in full sight of the glare of the furnaces, whilst the town extended over the warren till the bird finally became extinct. No doubt, to this persistence alone, we owe the fact of the birds still breeding in our county. We will suppose that it has selected the fallows as its nesting-place. If the eggs are hatched before the ground is broken up for turnips, well and good, for it is a position where their colour makes them all but visible. Next year the same field is sown with barley, and the bird lays there again. If the eggs escape the roller, they will be destroyed by the hoe or the sprinkler, and until the next year, when the field rests quiet in seeds, they have no chance of hatching safely, *i.e.*, for two out of four years rotation they are certain to be destroyed. Londesboro' may be taken as a typical instance of the bird's chance of reproducing its species on cultivated ground. In forty years it has tried three times to establish itself there, on each occasion the eggs have been taken, the last date being May 1906, when the birds were destroyed or driven away, and have not returned. This part of the Wolds is too much cultivated, and the fields too small for safety. Fortunately the Stone Curlew has shewn some adaptability to circumstances. Thrice I have seen the nest in plantations, whether because the bird had kept to the old breeding-ground after it was planted, or had gone there for safety, I cannot say, but in the photo shewn in 'Birds of Yorkshire,' the nest was in a spinney thickly planted, among young trees ten feet high. In such a place of course, opportunities for escape before the searcher can observe the bird are obvious. No doubt the habit is exceptional, as only two other instances are mentioned,



viz., one by Newton, and one by Stevenson. The favourite breeding-site appears to be a low spur of wold, not too much exposed to the wind, where a good look-out can be kept ; but I have seen the nest on bare chalk pebbles, and on grass, and even on the side of one of those steep valleys so peculiar to the Wolds, where the out-look is very much restricted.

On the Wolds, the nest is usually lined with chalk pebbles ; on the Suffolk Warrens, with rabbits' dung. I have even seen grass in it here. No doubt the object of the lining is to isolate the eggs from the damp ground. The eggs are always two, of which one is sometimes addled. The earliest eggs I have seen were on 5th May, very 'hard sat,' and the latest on 11th May, fresh, the former in a plantation, the latter on the open wold. The period of incubation, as stated by Mr. E. G. Meade Waldo, in 'British Birds,' August 1907, is twenty-six to twenty-seven days, which I have verified from my own experience, so that we have our wold birds laying at the unusually early date of 15th April or thereabouts, and almost a month's interval between the earliest and latest eggs. If the eggs are taken, a second or even a third clutch is laid. I have heard of fresh eggs being taken on Brumby Warren as late as 11th July. One egg is generally more incubated than the other, shewing that the bird has to guard them against natural enemies. The young, when hatched, are covered with a beautiful light buff down, with two fine black streaks down the back. Their first instinct seems to be to crouch with head along the ground, and closed eyes, and their colouring makes them almost invisible on the flinty soil.

At the nest the parent bird is incredibly shy, being absolutely invisible. Apparently it runs from the eggs, and does not fly up, for it is in my experience, impossible to see it at all, and an hour or two's watching is of no use to detect it. Only if the eggs are well incubated, and the intruder remains too long near the nest, the bird's cries of distress may be heard, and it may be seen standing sentinel on the ridge of a distant hillside, with head drawn back into its shoulders. Once I detected it watching me from behind a molehill, its eye just projecting above the soil.

The natives, as a rule, know the bird only by its habit of flying over the valleys before stormy weather comes.

How many pairs there may be on the Wolds it is impossible to say. They are so scattered, so shy and invisible, that one might go over the ground where they were a dozen times and never see them. Mr. Hewett, at the meeting of the Yorkshire

Naturalists' Union, on November 21st, 1908, said he knew of four or five nests, and the writer could beat that number of pairs of birds.

The important question for us is 'What chance has the bird of surviving?' It must be constantly disturbed, now and then it is shot, especially on migration, when odd birds have been obtained near our coasts even in winter; and in so small a stock, the danger of inbreeding is a serious one, unless the numbers are recruited by immigrants from other districts. Its rate of reproduction is also a very slow one. The eggs are sometimes taken by dealers, as I have heard of their being offered in Beverley in exchange during recent years, and their protection in so wide an area appears hopeless. Game preservers, however, might forbid their keepers to shoot the old birds.

On the other hand, the cultivation of the Wolds appears to have reached its highest point. The natives take no interest in the bird. Its extreme shyness, and the protective colouring of bird and eggs in such an environment are encouraging. That it can be driven away seems improbable, for its nature is to return to the haunts where it was bred, until it becomes extinct, and we may gather some hope from the history of the bird on the chalk downs of Hampshire.

Gilbert White, in his 'History of Selborne,' 1768-1788, speaks of the plentifulness of the Stone Curlew, and the ease with which it could be detected. His successor, Thos. Bell, who re-edited his letters in 1877, says:—'In thirty years I have never seen one, alive or dead.' But Messrs. Kelsall and Munn, in 'Birds of Hampshire and the Isle of Wight,' 1905, say:—'Some recent observers, living at Selborne, have fancied that the species has disappeared from the neighbourhood, but we have good reason to believe that it still nests within a very short distance of the historic village. For some reason or other, the Stone Curlew has developed very suspicious and wary habits, and though many eggs are destroyed when the young wheat is rolled, they usually manage to rear a brood.' If, then, this is true of the chalk downs of Hampshire, why not of our own Yorkshire Chalk Wolds?

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In an article appropriately headed 'Namesakes in Science,' in a contemporary, we notice a 'son of his father,' makes his debut as an artist-naturalist. He is evidently following in his father's footsteps. Oddly enough, his first published sketch is of the Lyre Bird.

## NOTES ON THE LEPIDOPTERA OF SOUTH YORKSHIRE IN 1908.

B. MORLEY.

THE past season has been a most interesting one in the Skelmanthorpe district, and, from the collector's stand-point, a great improvement on the season of 1907. With certain exceptions, insects have been vastly more plentiful, especially during the summer months. The severe wintry weather did not seem to have been very disastrous to hibernating larvæ, and many had commenced feeding when the arctic conditions became so very pronounced in mid-April. That adversity, however, did not seem to diminish their numbers much, for when spring-like conditions did obtain the herbaceous feeders were very abundant. The tree feeders did not fare so well, for seldom in our experience have the larvæ of *Xanthia citrigo*, *X. silago*, etc. been so scarce. Another exception was the larvæ of *Agrotis agathina*. This was exposed to the full blast on the high grounds of its haunts, at a time when it should have been feeding, and no doubt caused its numbers to be thinned considerably. When 'sugaring' was commenced in mid-June, there was further proof of the herbaceous feeders having been in abundance, as on to the middle of September 'sugar' was seldom a failure; on favourable nights insects absolutely swarmed. During 1907, on what were apparently good nights, nothing much came to the patches. During this season on the other hand, insects were always about on what apparently seemed to be unpropitious nights, a fact that was once or twice especially noteworthy. For example, the night of July 18th was miserably cold and damp, with a north wind and an occasional drizzle—a night most collectors would have voted hopeless; and yet it justified the undertaking of a fairly long journey, for insects came to the patches freely, and useful collecting resulted.

During their respective times of occurrence, the following were in extraordinary abundance, and though most are regarded as common species, it will be of interest perhaps, to give a detailed list:—*Xylophasia rurea*, *X. polyodon*, *Triphæna pronuba*, *T. comes*, *Noctua augur*, *N. baja*, *N. festiva*, *N. brunnea*, *N. c-nigrum*, *N. xanthographa*, *N. plecta*, *Agrotis exclamationis*, *Mamestra brassicæ*, *Apamea basilinea*, *A. oculatea*, *A. gemina*, *Leucania pallens*, *L. impura*, *L. lithargyria*, *Miana strigilis*, *M. fasciuncula*, *M. arcuosa*, *Euplexia lucipara*.

The following were very common:—*Hadena dentina*, *H. thalassina*, *H. adusta*, *H. pisi*, *H. oleracea*, *Aplecta nebulosa*, *Mania typica*, *Xylophasia scolopacina* (at Haw Park, Wakefield), *X. lithoxylea*, *Mamestra furva*, *Cymatophora duplaris*, *Cosmia paleacea*, *Orthosia suspecta*, and many others were frequent visitors to the 'sugar' patches. Flowers also proved to be well worth attention. Sallows, of course, produced nothing worthy of special mention, owing to the wintry weather when they had come into bloom. The flowers of campion and wound-wort had many visitors, including *Plusia chrysitis*, *P. iota*, *P. pulchrina*, with many of the species mentioned above. Ragwort also was much patronized. Heather had much attraction for *Noctua glareosa*, *N. dahlia*, *Hydræcia nictitans*, and many others.

After mid-September, 'sugar' lost its attraction for the noctuæ, and nothing of much interest occurred as a result of its use during autumn. Other noctuæ, for which neither 'sugar' nor flowers have little attraction, now claim notice. An effort made to turn up *Hydræcia petasitis* resulted in the species being found common at Huddersfield and Normanton. It no doubt occurs in most places in the West Riding, where butter-bur is plentiful.

*Polia chi* was exceedingly common, and was perhaps the most interesting species of the year in the Skelmanthorpe district. Its habit of sitting on the walls in the day time, gives the collector fine chances of taking his choice without much trouble. Careful search this season was rewarded with good results, its variety *olivacea* was common, as was also a very heavily marked form, not referable to *olivacea*. Another form frequently found has the wings a drab colour, with all the markings obliterated, except the black *chi* mark, which is very small and well defined. It is a very fine and beautiful form, probably of recent development, and the most decided variation from the type we have noticed in the Skelmanthorpe neighbourhood. *Dasypolia templi* has been common on the street lamps in this district, and two specimens are reported to have been taken at Lartington, near York.

On the moors near Penistone, larvæ of *Bombyx* var. *callunæ* were common, and the imagines of *Cloantha solidaginis*, *Larentia multistrigaria*, *L. cæsiata*, *Oporabia filigrammaria* and *Anarta myrtilli* were very plentiful.

The season seems to have been a good one for *Acherontia*

*atropos* ; numerous reports of its capture from various parts of the county are to hand. In the neighbouring village of Shepley a dead one was found in a spider's web. It was tethered fast in the web, and had probably been killed by the spider, surely a record of spider pugnacity, for besides having its clumsy captive to contend with, its efforts in securing the monster would be accompanied by a squeak sufficiently unnerving to fill with fear much higher organisms than spiders. The insect was a male, and, considering its ignominious death, was in fair condition. The Geometræ have always been below the average, which is rather surprising, considering the fine summer we have had, but probably the cause may be traced to the miserably bad weather of last year. Many usually common species have scarcely put in an appearance, and others have not been noticed at all. However, *Selenia lunaria*, a scarce species in the West Riding, has been taken both at Barnsley and Skelmanthorpe. A visit to Thorne Waste on July 11th, although a wet day, resulted in the following being taken commonly :—*Macaria liturata*, *Timandra amataria*, *Eubolia limitata*, and other common geometræ. *Ino statices* and *Zygæna filipendulæ* were also both common there. Of butterflies there is little to report, the Skelmanthorpe district is a very poor region for the Rhopalocera. Melanism seems to be on the increase, and is especially noticeable in *Aplecta nebulosa*, the var. *robsoni* being common (at Haw Park); and the local races of *C. viminalis*, *A. agathina*, *M. strigilis* and *C. duplaris* seem to be entirely black. *X. polyodon*, *L. multistrigaria*, *L. cæsiata*, *A. oculatea*, *B. repandata*, *P. pilosaria* are all species very much subject to melanism ;—indeed, extreme black ones of each species are of common occurrence.

Another species in which melanism was not suspected has been brought to our notice in *Himera pennaria*. Mr. H. Dyson, of Skelmanthorpe, reared a brood from eggs obtained from an apparently quite ordinary female, and nothing more than an ordinary bred series of insects was expected as the result. All the brood, however, are of a dark reddish brown colour, darker than any we have previously seen, and many of the males have the basal half of the fore-wings heavily suffused with lead colour, giving them a very dingy appearance.

From other districts friends have supplied me with the following valuable records. Mr. Porritt has taken in a wood near Sheffield, *Macaria liturata* var. *nigrofulvata*, a variety sup-

posed to be almost confined to Delamere Forest, in Cheshire. Mr. Fletcher, of Wakefield, reports *Acronycta leporina* and *Cymatophora fluctuosa* from his district. From Hull, Mr. Porter reports larvæ of *Cirrædia xerampelina* and *Agrotis obscura* common at Spurn. The Rev. T. B. Eddrup reports *Sphinx convolvuli* from Horbury.

Much attention has been paid to the breeding of *Abraxas grossulariata* in a number of districts, and fine series of varieties resulted. The varieties *varleyata*, *hazeleighensis*, and *nigro-sparsata* are a few of the named forms that have been reared, along with many other equally curious and striking varieties.

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**Traité de Géologie : I. Les Phénomènes géologiques**, par **Emile Haug**, professeur à la Faculté des Sciences de l'Université de Paris. Un vol. in-8° raisin (26<sup>c</sup> × 16<sup>c</sup>), de 540 pages, avec 195 figures et cartes et 71 planches de reproductions photographiques (Librairie Armand Colin, rue de Mézières, 5, Paris), broché. 12 fr. 50 [10-6d.].

For some time there has been an opening for a French treatise dealing with geological phenomena, which shall be intermediate between the elementary text-book and the more technical memoirs which are scattered in the proceedings of scientific societies, and are consequently not generally accessible. In the present work M. Emile Haug has supplied the want, and places upon permanent record an admirable series of essays suitable for the educated public.

M. Haug first describes the continental and ocean centres, which are the seats of phenomena of sedimentation. He assists us in the working out of the material which constitutes the crust of the earth, ending, by the continuous erosion (de-gradation) of terrestrial features (relief), in the formation of a level surface (pénéplaine), the last phase of the cycle of 'geological phenomena.'

Leaving these quite elementary ideas, the author places the reader in the presence of the most important problems of modern geology. The 'Traité de Géologie' offers on that account equal interest for the amateur and the professional geologist. Both will appreciate the copious bibliographical notes placed at the end of each chapter, which will guide the reader in making further researches.

The work is illustrated by 195 figures and plans, and 71 excellent plates of photographic reproductions; but the paper wrappers to the volume hardly survive the post. We cannot understand why our friends across the channel should so frequently place such valuable work in such flimsy covers.

**British Mosses** (2nd edition), by **Sir Edward Fry** (Witherby & Co., price 1/6), is an interesting little book in its way, and will be read with profit by beginners in the study of this charming group of plants. It draws attention to the position held by mosses in the classification of Cryptogams, and traces in detail the life-history of an ordinary moss, through its half-dozen stages—when the complete cycle is run. Instances are quoted of many that take a short cut across the circle, and dispense with one or more stages in their reproduction. A table is given of nine different methods of reproduction adopted by these plants. Attention is drawn to the remarkable variety of form and structure in the leaves and capsules. The booklet concludes with an outline of the important part these little plants at present play, and have played in the past, on the earth's surface.

C. C.

## THE FUNGUS FLORA OF MULGRAVE WOODS.

C. CROSSLAND, F.L.S.

THE eighteenth Annual Fungus Foray in connection with the Yorkshire Naturalists' Union was held September 19th-24th, at the picturesque sea-side village of Sandsend, for the investigation of Mulgrave Woods and adjoining pastures. All the members of the Mycological Committee attended, with two exceptions. Besides several other members of the Union interested in the subject, there were mycologists present from Cumberland, Derbyshire, Lincolnshire and Lancashire—twenty-two in all, including two ladies—Miss Decima Graham, Carlisle, and Miss Peniston, Leeds.

The Marquis of Normandy granted special permission to visit the parks and extensive woodlands on the Mulgrave estates. This kindness was supplemented by the Vicar of Lythe allowing the members the use of two commodious school-rooms at Sandsend, from Monday to Thursday. The use of these as general meeting-room and work-room very much facilitated the proceedings, and tended largely to bring about the successful results obtained. Excellent accommodation was secured at three boarding-houses, the school-rooms being used as headquarters.

The Committee made the most of these privileges and opportunities by having all the necessary books and appliances at hand for working out the finds.

The grand old Mulgrave Woods have long been favourite hunting grounds for Yorkshire mycologists. They are rich in vegetation, with the ground almost constantly moist; these conditions, accompanied by shade, encourage the growth of a great variety of fungi on decaying woody and herbaceous remains. Here fungi are not dependant on rainfall for the necessary amount of moisture; hence these woodlands at any time supply material for a mycological student. One could not help feeling what a vast field there is the year round for a local student, did one exist.

A preliminary run out was made on the Saturday afternoon, when it soon became evident that an abundant supply of these interesting organisms could be relied upon. Two or three species of *Leptonia* were plentiful in the pastures; this caused the most experienced member present to remark that when

this happens, it is an almost certain sign that fungi generally are abundant in the woods, and so it proved.

The collecting was done in small parties so that more ground could be covered. The entrances to the woods being close at hand, no time was wasted in long drives or railway journeys, either at the beginning or ending of each day's investigations. In addition to the woods, there was plenty of pasture and meadowland to look over.

Each season, in all districts, there is a varying preponderance of a few families of agarics over others; some are plentiful, others scarce. This season at Mulgrave, many genera abounded notably *Tricholoma*, with twenty-four species found; *Mycena*, thirty-two; *Russula*, twenty-eight; *Cortinarius*, twenty-nine; *Lactarius*, twenty; *Philiota*, ten; *Inocybe*, thirteen; *Hygrophorus*, eighteen; and so on. Other genera were comparatively equally prevalent; even Jew's ear was abundant at Sandsend in a fence formed of aged elderberry trees. During the five days very much more material was met with than on any previous occasion. Among it were many common species that occur everywhere. Attention was given to all branches of the subject, more particularly, perhaps, to micro species.

At the rooms all the spacious table accommodation was occupied by named specimens left there for the benefit of the less-experienced students. One part of the interest lies in seeing the immense variety in size, shape, and colour displayed by the Agarics alone, when laid side by side.

On Monday evening Mr Massee gave an address on 'Economic Mycology,' dealing more especially with fungi that attack potato tubers, causing them to rot. One of these—a *Thielavia*, has been proved to have four distinct stages, each one of which, prior to the life-history of the fungus becoming fully known, was considered a distinct species. Mr. Massee's preliminary remarks appear on page 28. A special paper on the *Thielavia*, with figure, will appear later.

The same evening Mr. Wager discoursed on 'The Development of Spores in the Basidiomycetes,' tracing the fusion of a couple of nuclei into one, and its subsequent division into two or four, mostly four, in the young basidium. Later, or concurrently with the formation of the resultant nuclei, two or four projections (according to the species) spring from the upper part of the basidium. These develop into narrow cones (sterigmata), through each of which a nucleus passes upwards



from the body of the basidium into a bulb-like formation at the tip of the sterigma, which eventually ripens into a spore.

On the Tuesday evening Mr. H. C. Hawley read a paper on 'New Fungi found in Lincolnshire,' and also referred to a number of interesting species found on a single decaying thistle at the Brafferton excursion last May.

Mr. J. W. H. Johnson read a paper on 'Fungi which have developed on material taken from polluted West Riding streams.'

Much interest was taken in the proceedings by the villagers, many of whom asked permission to come in to the exhibits room to see the collection of fungi on the tables. Several brought in specimens they themselves had collected to ask what they were. One or other of the members were always at hand to give them attention. Sensible utilitarian questions, such as 'Which are edible?' 'Is that good to eat?' etc. were put. To them, the edible aspect appealed the most; they could see no other recompense in the study of fungi. Their attitude reminded the writer of a friend of his, who, on seeing him overhauling a toadstool, asked if it was fit to eat; on the reply 'No, this one isn't' being given, the quariest says: 'What are you bothering with it for then?' This neatly sums up the common notion in respect to the study of toadstools. There were eighteen or twenty edible species on the tables, pointed out to the visitors. This side of the study was encouraged, but at the same time, the enquirers were advised to gather none to cook only well-marked species, about which there could be no possibility of mistake, such as the parasol mushroom, shaggy caps, ivory caps, blewits, etc. In June, it was noticed by the writer that St. George's mushroom—*Tricholoma gambosum*—one of the best of edible toadstools, was very abundant in the fields.

At the close of the Foray, and after a few boxes of micro-material had been gone through by several members at home, the total determined reached 612 'species' and 12 vars. The analysis of the list shows that three—*Tricholoma carneolum*, *Pholiota sororia* and *Inocybe commixta*—are additions to the British Fungus Flora, twenty-seven new to the county, and seventy-six to vice county N.E. 256 are additions to the previously known fungus flora of Mulgrave Woods and adjoining pastures, which now amounts to 816 'species.'

It must be understood that many are but stages in the life-

history of fungi that may have two or even three conditions. As these become better known throughout the county, a reduction in the numbers of previously supposed species will be necessary to get at a more accurate census of the fungi of the county.

The weather was all that could be desired for collecting purposes; rain began to fall on Tuesday morning, but soon cleared off. Several species of special interest were met with, one being *Bolbitius Boltoni* Fr., about which some uncertainty has been expressed as to whether it was a native of Britain (Mass. 'Brit. Fung. Flo.,' II., p. 205). It is quite distinct from *B. flavidus* in the depressed, darker disc and subadnate gills.

Sandsend proved a most suitable place for headquarters, being close to the ground to be investigated. The school-rooms were ideal places for general work and exhibit-rooms. An easily obtainable sea-side saunter afforded a charming break in the work for those who had the time and the inclination to indulge in this delightful and invigorating pastime. With us these were few; the woods and the work-room having the preference. A few, including Messrs. Masee and Clarke, were so absorbed in working out material brought in, that they did not get even into the woods.

At the business meeting on the Wednesday evening, a vote of thanks was heartily passed to Lord Normandy for leave to explore the estates, and to Vicar Harland, for allowing us the use of the school-rooms.

The Committee for the current year was re-elected. Castle Howard is recommended to the Union as the place for the next foray—September 18th-23rd, 1909.

In the following bald list, those new to Britain are marked \*, to Yorkshire, †. The remainder are all additions to the Mulgrave district, previous records having been strictly excluded.

<i>Crucibulum vulgare.</i>	<i>T. luridum.</i>
<i>Lycoperdon echinatum.</i>	† <i>T. squarrulosum.</i>
<i>L. caelatum.</i>	<i>T. saponaceum.</i>
<i>Bovista pusilla.</i>	<i>T. sulphureum.</i>
	† <i>T. cerinum.</i>
<i>Lepiota rachodes.</i>	<i>T. ionides.</i>
<i>L. carcharia.</i>	* <i>T. carneolum.</i>
† <i>L. glioderma.</i>	<i>T. gambosum</i> (In June).
<i>Armillaria ramentacea.</i>	<i>T. nudum.</i>
<i>Tricholoma sejunctum.</i>	<i>T. saevum.</i>
<i>T. ustale.</i>	<i>T. panæolum.</i>

- Tricholoma melolencum.*  
and Var. *porphyrolencum.*  
*T. humile.*  
*T. sordidum.*  
*T. paedidum.*  
† *Cliticybe comitalis.*  
*C. phyllophila.*  
*C. pithyophila.*  
*C. dealbata.*  
† *C. ampla.*  
*C. gigantea.*  
*C. geotropa.*  
*C. cyathiformis.*  
† *C. expallens.*  
*Collybia nummularia.*  
*C. esculenta.*  
† *C. exsculpta.*  
*Mycena lineata.*  
*M. flavo-alba.*  
*M. gypsea.*  
*M. pullata.*  
*M. metata.*  
*M. aetites.*  
*M. amicta.*  
*M. tenella.*  
*M. rorida.*  
*M. stylobates.*  
*M. hiemalis.*  
*M. setosa.*  
*M. capillaris.*  
*Omphalia hydrogramma.*  
*Pleurotus ostreatus.*  
*P. chioneus.*  
*Entoloma prunuloides.*  
*Leptonia solstitialis.*  
*L. euchroa.*  
*Nolanea pisciodora.*  
*Eccilia rhodocylix.*  
*Claudopus depluens.*  
† *Pholiota terrigena.*  
*P. ombrophila.*  
*P. squarrosa* var. *Mülleri.*  
*P. flammans.*  
*P. tuberculosa.*  
\* *P. sororia.* †  
† *Inocybe hirsuta.*  
† *I. hæmacta.*  
*I. scaber.*  
*I. Bongardii.*  
*I. carpta.*
- I. scabella.*  
*I. violacea-fusca.*  
\* *I. commixta.*  
*Hebeloma glutinosum.*  
*H. crustuliniforme* var. *minor* Cke.  
= *hiemale* Bres.  
*H. nudipes.*  
*H. nauseosum.*  
*Flammula gymnopodia.*  
*F. gummosa.*  
*F. alnicola.*  
*F. sapinea.*  
*F. ochrochlora.*  
*Naucoria melinoides.*  
*N. semiorbicularis.*  
*N. tabacina.*  
*N. temulenta.*  
*N. erinacea.*  
*Galera ovalis.*  
*Tubaria furfuracea.*  
Var. *trigonophylla.*  
*Bolbitius Boltoni.*  
*B. fragilis.*  
*B. titubaus.*  
*Cortinarius (Phleg.) sebaceus.*  
† *C. (Phleg.) variicolour.*  
*C. (Myxa.) livido-ochraceus.*  
*C. (Ino.) violaceus.*  
*C. (Derm.) anomalus.*  
† *C. (Tela.) macropus.*  
† *C. (Tela.) bovinus.*  
*C. (Tela.) rigidus.*  
*C. (Hygr.) saturninus.*  
*C. (Hygr.) castaneus.*  
*C. (Hygr.) rigens.*  
*Agaricus sylvaticus.*  
*A. campestris* var. *hortensis.*  
*A. comptulus.*  
*Stropharia inuncta.*  
*S. coronilla.*  
*S. merdaria.*  
*Panæolus phalænarum.*  
*Psathyra elata.*  
*P. conopilea.*  
*P. spadiceo grisea.*  
*Coprinus soboliferus.*  
*C. Gibbsii.*  
*C. cordisporus.*  
*Paxillus lepista.*  
† *P. extenuatus.*

*Hygrophorus russo-coriaceus.*  
*H. sciophanus.*  
 † *H. mucronellus.*  
*H. nitratus.*  
*Lactarius insulsus.*  
*L. trivialis.*  
*L. piperatus.*  
*L. rufus.*  
*L. fuliginosus.*  
*L. mitissimus.*  
*L. camphoratus.*  
*L. cimicarius.*  
*L. obliquus.*  
*Russula drimeia.*  
 † *R. atro-purpurea.*  
*R. Linnæi.*  
*R. veteriosa.*  
*R. decolorans.*  
*R. ochracea.*  
*Marasmius prasiosmus.*  
*M. fuscopurpureus.*  
 † *M. Wynnei.*  
*M. candidus.*  
*Panus conchatus.*  
  
*Boletus crassus.*  
*Polyporus dryadeus.*  
 † *P. lacteus.*  
*Polystictus radiatus.*  
*Fomes connatus.*  
*Poria medulla-panis.*  
*Merulius corium.*  
  
 † *Hydnum sordidum.*  
*Radulum orbiculare.*  
*Phlebia contorta.*  
*Odontia fimbriata.*  
  
*Solenia anomala.* Var. *ochracea.*  
*Corticium calceum.*  
*Hymenochæta fuliginosa.*  
*H. corrugata.*  
*Peniophora rosea.*  
*Coniophora sulphurea.*  
*C. puteana.*  
  
*Clavaria formosa.*  
*C. abietina.*  
*C. incarnata.*  
*C. dissipabilis.*  
*C. ligula.*

*Typhula erythropus.*  
 † *T. gracilis.*  
*Pistilaria quisquilaris.*  
*P. puberula.*  
  
*Exidia recisa.*  
*E. albida.*  
*Næmatelia encephala.*  
*Calocera stricta.*  
  
*Melampsora epitea.* On *Salix viminalis.*  
*M. circææ.* On *Circæa lutetiana*  
*Coleosporium senecionis.* On *Senecio vulgaris.*  
*Puccinia saniculæ.* On *Sanicula europæa.*  
*P. obscura.* *Æcid.* On *Bellis perennis*, abundant.  
*P. centaureæ.* On *Centaurea nigra.*  
*P. lychnidearum.* On *Lychnis diurna.*  
*P. glomerata.* On *Senecio Jacobæa*  
*P. veronicarum.* On *Veronica montana.*  
  
*Phragmidium violaceum.* On *Rubus fruticosus.*  
*Triphragmium ulmaricæ.* Un *Spiræa ulmaria.*  
*Ustilago violacea.*  
  
*Epichloe typhina.*  
*Nectria cucurbitula.*  
*N. aquifolii.*  
*Hypomyces aurantius.*  
*Xylaria polymorpha.*  
*Ustilina vulgaris.*  
*Hypoxylon multifome.*  
*H. rubiginosum.*  
*Phyllachora graminis.*  
*Diatrype aspera.*  
*Valsa ceratophora.*  
*V. leiphæmia.*  
*Eutypa Acharii.*  
 † *E. scabrosa.*  
*Rosellinia pulveracea.*  
*Sordaria minuta.*  
*S. curvula.*  
*Sporormia intermedia.*  
*Raphidospora rubella.*  
*R. acuminata.*

*Heptameria doliolum.*  
and Var. *conoidea*.

*Pleospora meliloti.*  
*Hypoderma virgultorum.*  
*Gloniopsis curvata.*  
*Hysterium pulicare.*

*Geoglossum glutinosum.*  
*Mitryla olivacea.*  
*Geopyxis cupularis.*  
*Humaria carbonigena.*  
*Lachnea coprinaria.*  
*Dasyscypha ciliaris.*  
*D. puberula.*  
*Ciboria ochroleuca.*  
*C. luteovirescens.*  
*Helotium virgultorum.*  
*H. herbarum.*  
*H. epiphyllum.*  
*H. immutabile.*  
*H. alniellum.*  
*Mollisia lignicola.*  
*Ryparobius sexdecemsporus.*  
*Ascophanus carneus.*  
*A. argenteus.*  
*A. ochraceus.*  
*A. equinus.*  
*Ascobolus immersus.*  
*Saccobolus neglectus.*  
*S. Kerverni.*  
*Coryne urnalis.*

*Stictis radiata.*  
*Phacidium multivalve.*  
*Pilobolus Kleinii.*  
*Pilaira anomala.*  
*Spinellus fusiger.*  
*Chætocladium Jonesii.*  
*Piptocephalis [repens?].*  
*Peronospora grisea.*

*Sphæronebella fimicola.*  
† *Gloeosporium podograria.*

*Cylindrium flavovirens.*  
*Botrytis Tilletii.*  
† *Ovularia interstitialis.*  
*Ramularia calcea.*  
*Periconia pycnospora.*  
*Dendryphium comosum.*  
*Stilbum fasciculatum.*  
*Stysanus stemontes.*

† *Tubercularia brassicæ.*  
*Bactridium flavum.*  
*Fusarium roseum.*  
*Epicoccum herbarum.*

*Clathrotychium rugulosum.*  
*Perichæna depressa.*  
*Arcyria cinerea.*  
*Trichia fragilis.*  
*T. chrysosperma.*  
*Spumaria alba.*

The members and friends present at the Foray have been supplied with a lithographed MS. copy of the complete list of the 612 'species' found on this occasion.

**Guide to the Specimens Illustrating the Races of Mankind** (Anthropology) exhibited in the Department of Zoology, British Museum (Natural History). Illustrated by 16 figures. 32 pp., 1908. Price 4d.

This cheap handbook is the work of Mr. R. Lydekker, to whom has been entrusted the formation and arrangement of the series in its present form. The specimens illustrate Man solely from the zoological point of view, i.e., his bodily structure and his geographical distribution. This subject has been much neglected in our national museum, and it is to be hoped that one result of this excellent little handbook will be that more help will be given to the authorities at South Kensington in the way of photographs and specimens.

**Wild Life in a Southern Country**, by Richard Jefferies. London: Thos. Nelson & Sons. 384 pp., 1/-

By an arrangement with Messrs. Smith, Elder & Co., Messrs. Nelson have produced this charming book as one of their shilling series. We feel that it is only necessary to draw our readers' attention to the low price at which the book can now be bought. It is well and artistically bound, the paper is good, the type clear, and there is a portrait of Jefferies. How it is possible to publish the volume at the price is a mystery.

## ECONOMIC MYCOLOGY.

G. MASSEE, F.L.S.

*Kew.*

THE importance of the correct determination of species cannot be over-estimated. Whatever branch of botany is followed, its real value depends upon being quite certain as to the particular species dealt with. It has been clearly demonstrated that many of the apparent contradictions, so general in morphological and cytological dissertations, have originated in mistaking one species for another. *A* describes some peculiarities of structure or otherwise, present in a given species. *B* promptly follows in line to corroborate or refute the discovery, mistakes his species, and much argument follows. Notwithstanding the value of being able to correctly discriminate species, the fact that being able to do so fails to advance our knowledge in any way as bearing on the why and wherefore of such species, in other words, it does not touch the great problem concerning origin, affinities, etc.

As a body we are justly proud of our 'Fungus Flora of Yorkshire,' nevertheless, we must endeavour to maintain a correct sense of proportion, and not become slaves to list-making alone. We have now a thoroughly representative Fungus Flora of our county, and the addition of a few more or less, can make no difference from the standpoint of pure knowledge. The area of our county is too insignificant, as is also that of Great Britain, to be admitted as a factor in the distribution of Fungi over the globe.

Many Fungi are unique amongst plants in appearing under very different forms, during different periods of their development, the different forms often growing on different host-plants. These various forms were at one time considered as independent species, and received special names. Such names must remain until proof is forthcoming, that two or more such forms are in reality but stages in the life-cycle of one species. This is the kind of work that Yorkshire mycologists might attempt.

Between sixty and seventy thousand species of Fungi are known; out of these it is certain that at least twenty five thousand so-called species are nothing more than phases of other higher forms. There are some hundreds of such in the list of names of Yorkshire Fungi, and it becomes the duty of Yorkshire

mycologists to remove such from the list, by connecting them with the higher forms to which they belong. If such work cannot be carried out to finality, yet much can be done in the field and at home to suggest such affinities. All the Hyphomycetes, popularly known as moulds, are only forms, not entities, the same is true of the species of *Phoma*, *Cladosporium*, etc. If the substance on which these are growing is kept under observation, it may be for weeks, or even months, a second stage will follow the first. If this sequence of development is constantly repeated, it is highly probable—but not definite proof—that the two forms are related to each other. The definite proof consists in producing one stage from the spores produced by the alternate condition, a work of no insuperable difficulty.

During the summer our plane trees are often defoliated early in the season, owing to a minute fungus called *Glaeosporium nervisequum*. In the spring a second form of the fungus appears on the wounds made by the first on the dead fallen leaves. This second form was known as *Pseudopeziza platani*. In consequence, the name *Glaeosporium* is dropped, as it is known to be only a stage of the ascigerous *Pseudopeziza*.

Our object up to the present has been to obtain the greatest possible number of names of Fungi inhabiting Yorkshire. Our future ambition should be to reduce the list of names as much as possible, along the lines indicated above.

It may be thought that the Agarics are not included in the category of duplicate forms. This is not so, many so-called moulds are only the conidial forms of Agarics.\*

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**National Museum. The Danish Collection: Pre-historic Period. Guide for Visitors, Copenhagen,** Prepared under the direction of **Dr. G. A. Auden.** 1908. [58 pp., not numbered].

The great majority of English visitors to the well-known Museum at Copenhagen are unfamiliar with the Danish language, and consequently do not reap the full benefit from a perusal of the unrivalled collections there exhibited. Recently a German edition of the guide-book appeared, dealing with the pre-historic section, and thanks to Dr. Auden, there is now an English edition. This is a concise account of the chief objects of interest in this rich institution, and the more important specimens are figured. Personally we should like to thank Dr. Auden for this further evidence of his practical interest in the study of Archaeology; and, at the same time, we must record our regret that he has left the north, where his help was needed.

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\* In addition to these useful and suggestive preliminary remarks, we hope shortly to print an account of the life-history of the *Thielavia*, with figure, by Mr. Massee.

## FIELD NOTES.

### BIRDS.

**A Leach's Fork-tailed Petrel** in very fair condition was shot at Barugh, near Barnsley, on October 17th, and is now in my possession. I intend to present it to the Barnsley Naturalists' Museum. The local occurrence of this species are all recorded in 'The Birds of Yorkshire,' by T. H. Nelson, the nearest being as follows :—One on the Don at Sprotborough, 1837 ; one on Sutton Common (near Askern) ; occasionally near Leeds ; one in Halifax street, 16th December, 1831. In T. Lister's notes, besides the above, he gives one shot near Halifax (Varley's notes, 1874), but, if I understand Mr. Nelson rightly, this specimen was wrongly identified.—W. BARRACLOUGH, Barnsley, October 28th, 1908.

**Honey Buzzard near Carlisle.**—A Honey Buzzard was shot near Carlisle on the 23rd October. It has not been recorded during the last thirty years for Cumberland. It has been lent to the Carlisle Museum.—L. E. HOPE, Carlisle.

**Fork-tailed Petrel at Carlisle.**—On November 17th, a Fork-tailed Petrel was picked up at Stanwix, Carlisle. It was in an exhausted state and died a few hours after capture. The bird has been given to the Carlisle Museum and proved on dissection to be an immature female. It was in fairly good condition and not emaciated as might have been expected of a storm driven bird.—L. E. HOPE, Carlisle.

**Eared Grebe on the Solway.**—An example of the Eared Grebe was shot at Bowness on the Solway on December 3rd ; a female in winter dress, but showing traces of nuptial dress on the neck and cheeks. This southern species rarely occurs on the Solway.—L. E. HOPE, Carlisle.

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### ENTOMOLOGY.

**The Death's Head Moth near Carlisle.**—The Death's Head Moth *A. atropos* has been taken commonly here during October. I have had four sent to the Museum as follows :—October 12th, ♀, Carlisle ; October 13th, ♀, Abbey Town, Carlisle ; October 15th, ♀, Shap (Westmorland) ; Newbiggin, Carlisle, October 14th, ♂. A female was also caught at Newbiggin, October 5th, and another female on October 10th, at Carlisle ; also a female, October 10th, at Bowness-on-Solway.—L. E. HOPE, Carlisle.



## REVIEWS AND BOOK NOTICES.

**Transactions of the Natural History Society of Northumberland, Durham and Newcastle-upon-Tyne.** (N.S.) Vol. III., Pt. I, 1908; pp. 1-222 + i-xxvii, Newcastle. 5/6.

We have received the volume for 1908 of the Transactions of this energetic Society, and it includes many valuable papers, several dealing with the more neglected branches of natural history. There are also several excellent illustrations. An appeal for funds for the publication of the Society's work resulted in over £245 being received. In addition to the Report for 1906-7, is a full report of Field Meetings, 1906, by Mr. R. Adamson; some miscellaneous notes by the Curator, Mr. E. Leonard Gill, from whose pen also appears an excellent appendix on 'The Hancock Museum and its History.' Miss M. V. Lebour gives a second instalment of her Memoirs on the Trematodes of the Northumberland Coast, and Mr. G. W. Temperley writes on 'The Northumberland Coast in September—an Ornithological Ramble.' There are two papers dealing with arachnida; Mr. A. Randell Jackson writes 'On some rare Arachnida captured during 1907,' and 'Allendale spiders' is by the Rev. J. E. Hull. Lt.-Col. C. H. E. Adamson gives part II. of his Catalogue of Butterflies collected in Burmah. A useful paper is by R. S. Bagnall, 'On some New Genera and Species of Thysanoptera.' There are also two valuable geological papers, viz., a 'Preliminary Note on a case of Thrust and Crush-Brecciation in the Magnesian Limestone, Co. Durham,' by Dr. D. Woolacott, and a lengthy and well-illustrated memoir on 'The Glacial Phenomena of the country between the Tyne and the Wansbeck.' Altogether, the volume is an ideal one for a provincial Society, and we should like to congratulate our Newcastle friends upon the way in which they are investigating the so-called 'unattractive' branches of natural history.

**Report of the Immigrations of Summer Residents in the Spring of 1907:** also Notes on the Migratory Movements during the Autumn of 1906. By the Migration Committee of the British Ornithologists' Club, and edited by **Mr. W. R. Ogilvie-Grant.** Being Vol. XXII., Bull. B.O.C., 202 pp. and 31 maps. Whitherby & Co., 6s. net (paper cover).

This, the Third Annual Report, is to hand, and is on similar lines to its two predecessors, excepting that, in addition, it gives some short notes on the autumn migrants of 1906. This work should be read by all British students of bird migration, although, as we have previously pointed out, it is not quite satisfactory. In places, it certainly gives one the impression in the series of immigrations through England, as is illustrated by the maps, that chosen data of a species have been inserted so as to fit in with the first, second, or third immigrations as the case may be. We must again protest that the bare term 'Yorkshire' is insufficient for the purpose, and only confuses the Yorkshire student of bird migration, by irretrievably mixing many important and distinct bird movements; although we are pleased to observe that the few notes from the lighthouse at Spurn are given under 'Yorkshire Lights.' We would suggest that in future Reports, the terms 'West Yorkshire,' 'East Yorkshire,' and 'Yorkshire Coast' should be used; and the same rule would, most probably, apply to most sea-board counties. At the same time, the thanks of all students of bird migration should be accorded to this Committee, and more particularly to Mr. Bonhote, for his work in endeavouring to classify the data of so many important observers stationed all over England and Wales—Lincolnshire, (an important county in this respect), being very poorly represented. It may be of interest to non-believers in 'March Cuckoos,' that the Committee acknowledge the authenticity of no fewer than six reports of Cuckoos from the south-western counties from March 26th to March 31st.

H.B.B.

## NORTHERN NEWS.

Dr. S. F. Harmer, F.R.S., of Cambridge, has been appointed keeper of Zoology at the British Museum, South Kensington.

We are glad to see that the Manchester Microscopical Society continues its excellent work in the way of lecturing, etc., in the surrounding district.

'*Eluma purpurascens*, a Woodlouse new to the British Isles' is figured and described by Denis R. Pack-Beresford in the 'Irish Naturalist' for December.

The Hon. W. Rothschild describes 'A new species of Bat Flea from Great Britain' in 'The Entomologist' for December; under the name *Nycteridopsylla longiceps*.

Dr. A. R. Dwerryhouse favours us with a copy of his Presidential Address to the Liverpool Geological Society, in which he deals with the modern hypotheses relating to the solar system.

Dr. Francis Galton has delivered an address to the Royal Society of Literature on 'Suggestions for improving the literary style of Scientific Memoirs.' This has been largely circulated, and it is hoped will prove beneficial.

We are glad to see that the Millport Marine Station is issuing a 'Reprint Series,' No. I. of which has recently reached us. It is a paper 'on *Trichorhiza*, a new Hydroid Genus,' by E. S. Russell, and is reprinted from the Proceedings of the Zoological Society of London.

The Sixth Annual Report of the Advisory Committee of the Bradford Botanic Garden bears further evidence of the success of the gardens in Lister Park. Our Bradford friends are to be congratulated upon the earnestness with which they have carried out this work.

An interesting slab of Triassic sandstone from the Storeton Quarries has recently been placed on exhibition in the Liverpool Museum. It shews sun-cracks, ripple-marks, impressions of foot-prints, and illustrates almost all the varied traces of life of the Trias found in the district.

A yellow-browed Warbler was found dead in a hedge at North Cotes, Lincolnshire, on October 10th. This is the second record of the bird for the county ('British Birds,' December 1908). In the same journal, Mr. G. H. Caton Haigh records that he shot a Sabine's gull off Gramthorpe Haven, Lincolnshire, on September 28th.

The Annual Report of the Ipswich Museum, recently to hand, indicates that an extraordinary amount of good work has been accomplished during the past twelve months in connection with the re-arrangement and re-labelling of the specimens. The Ipswich Museum is also fortunate in securing much substantial help voluntarily.

We have received the Annual Report of the Huddersfield Naturalist and Photographic Society for 1907-8. This contains brief reports of the various recorders, which are worthy of preservation. The report is a twelve-page pamphlet, measuring  $4\frac{3}{4} \times 5\frac{5}{8}$  inches—a very inconvenient size. It would have been much better if the ordinary 8vo size of previous reports had been followed.

Lieut-Col. Eschalaz has presented an admirable museum to the inhabitants of Waterloo, near Liverpool. It is largely devoted to British Birds. The donor points out that 'To shew one or two birds of each species in a case, would by no means convey the proper idea of these birds as they congregate on the edges of the cliffs; consequently, as many as are required to give a true representation of what they look like in their natural state are introduced.'

# THE NATURALIST.

A MONTHLY ILLUSTRATED JOURNAL OF  
NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY

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THE MUSEUM, HULL;

AND

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RILEY FORTUNE, F.Z.S.

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# Yorkshire Naturalists' Union.

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## SECTION FOR VERTEBRATE ZOOLOGY.

(President—Mr. Riley Fortune, F.Z.S.).

Two Meetings of the above Section will be held at the Leeds Institute, Leeds, at 3 p.m. and at 6-30 p.m. respectively, on Saturday, February 13th, 1909.

Short lectures will be given as follows:—Dr. C. J. Patten, M.A., on 'Four Hours' Continuous Observations of the Feeding Habits of Richardson's Skua,' Mr. E. E. Gregory on 'The Pleistocene Vertebrate Remains of the West Riding,' Mr. A. Whitaker on 'Our British Bats' (illustrated by lantern-slides), and Dr. E. S. Stewart, M.B.O.U., 'A Recent Ornithological Expedition into Spain.'

The following gentlemen will exhibit lantern-slides:—Mr. Jasper Atkinson, Mr. Riley Fortune, F.Z.S., Mr. Oxley Grabham, M.A., M.B.O.U., Prof. C. J. Patten, M.D., Sc.D., Mr. Walter Wilson, and Mr. W. Hewett.

### Agenda:—

At 3 p.m. there will be a meeting of the WILD BIRDS' AND EGGS' PROTECTION COMMITTEE. Members will then be at liberty to exhibit specimens, contribute notes, or ask questions. Dr. Stewart and Mr. Gregory will then give their papers.

The evening meeting (6-30 p.m.) will commence with Prof. Patten's lecture, and will be followed by Mr. Whitaker and Mr. Hewett, and concluded by the exhibition of lantern-slides.

All members and associates of the Yorkshire Naturalists' Union interested in Vertebrate Zoology are invited to attend, and to bring any notes, specimens, photographs, lantern-slides, etc.; and are requested to bring forward any matters of interest connected with the work of the Section, and to take part in any discussion.

Any member or associate is at liberty to introduce a friend.

**Please Note.**—As it is desired to make these meetings as representative as possible of the Yorkshire Naturalists' Union and of the County of Yorkshire—it is particularly requested that officials of the Affiliated Societies will draw the attention of their members to this notice.

Any further particulars can be obtained from the Honorary Secretary of the Yorkshire Naturalists' Union, at the Museum, Hull; from Mr. H. B. Booth, 'Ryhill,' Ben Rhydding; or from any of the officials of the Vertebrate Section.

## NOTES AND COMMENTS.

### THE PALÆONTOGRAPHICAL SOCIETY.

On the last day of the old year we received the volume of the Palæontographical Society for 1908, which contains many valuable monographs. Dr. A. Smith Woodward contributes part IV. of the 'Fossil Fishes of the English Chalk,' and includes *Elopoopsis crassus* from Barton-on-Humber, described by Dr. Woodward in these pages in 1907. There is a further instalment of the reproductions of Sowerby's figures of Inferior Oolite Ammonites. Drs. Gertrude Elles and Ethel M. R. Wood contribute part VII. of the Monograph of British Graptolites. Mr. Philip Lake gives part III. of 'British Cambrian Trilobites.' Mr. Henry Woods contributes a further instalment of his 'Cretaceous Lamellibranchiata,' in which some Speeton Clay fossils are figured and described. These monographs are indispensable to workers, are wonderfully cheap, and we should like to support the appeal that is made for further subscribers. The subscription is one guinea per annum, and should be sent to Dr. Smith Woodward, at the British Museum (Natural History).

### THE SOUTH EASTERN NATURALIST.

With the above title has been issued the 'Transactions of the South-Eastern Union of Scientific Societies for 1908,'\* under the editorship of Mr. J. W. Tutt. Besides detailed reports on the various sections of the Union's work, it contains the Presidential Address of Sir Archibald Geikie, F.R.S., on 'The Weald;' 'Gilbert White and Sussex,' by W. H. Mullens; 'Spiders of the Hastings District,' by W. R. Butterfield and W. H. Bennett; 'Mediæval Timber Houses of Kent and Sussex,' by J. E. Ray; 'Hastings Castle,' by H. Sands; 'Notes on Dewponds,' by E. A. Martin; 'Some Local Marine Sponges,' by E. Counold; 'Birds exhibited at the Congress Museum,' by N. F. Ticehurst, and 'The Pleistocene Vertebrates of South-East England,' by W. J. Lewis Abbott. The volume is illustrated by a number of plates, and reflects the greatest credit upon our friends in south-east England.

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\* London: Elliot Stock. lxxi + 121 pp. 2/6 net.

## HORNETS.

With reference to the query raised in these columns (page 53), as to whether the Hornet has been recorded for Yorkshire or not, we are glad to take the opportunity kindly afforded by Messrs. Cassell & Co., of reproducing an excellent illustration of male, queen and worker Hornets, which has appeared in their

*Photo by]***Hornets.***[John J. Ward.*

(1. Male; 2. Queen; 3. Worker).

interesting 'Nature Book,' already referred to in these columns. The illustration will serve to show the quality and kind of those appearing in Messrs. Cassell's publication. It will also, we hope, enable our readers to keep a look out for the species, and thus add to the few localities for which it is known in the north.

## RAY SOCIETY'S PUBLICATIONS.\*

The working zoologist has every reason to be thankful that such societies as the Ray Society are in a position to publish monographs on such a lavish scale as that before us. Otherwise the book could not be produced at a cost less than several times the price of the present volume, if produced at all. The Carnegie Trust has also given assistance for three years in regard to the artist, and section making, consequently the volume has been produced at a minimum of cost to the purchaser. The Society and author have also had the advantage of the knowledge and experience of Mr. John Hopkinson, the Secretary of the Ray Society, who has had much to do with the production of the work, and to whom the author duly acknowledges his great indebtedness.

## BRITISH MARINE ANNELIDS

In dealing with the British Marine Annelids, the author has had an extremely difficult task, partly on account of the paucity of really reliable literature on the subject; partly because of the difficulty in securing fresh material, and partly on account of the various classifications adopted by various authors. Prof. McIntosh does not feel warranted in adopting any of the recent classifications of the Polychæta, *e.g.*, that of Prof. Benham in the Cambridge Natural History: 'because none relieves the difficulties encountered in the older and more simple classification into errant and sedentary forms by Audouin and Edwards.' Some idea of the difficulties experienced in dealing with the literature upon the subject is shewn in the case of *Nephtys cæca*, where two of these large pages are devoted to a list of synonyms, varying in date from 1758 to 1906.

## AND THEIR COLOURS.

The annelids dealt with in the present volume are surely amongst the most beautifully ornamented of the invertebrates, and, as the author points out, they vie with the gaudy tints of butterflies and birds, or the burnished splendour of beetles. This is strikingly borne out by the numerous coloured plates, upon which are shewn some of the most charming representations of these gaily coloured annelids that could possibly be

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\* 'The British Annelids,' Vol. II., Part I. Polychæta, Nephthydidæ to Syllidæ, by Prof. W. C. McIntosh, M.D., F.R.S. 232 pp., plates. Issued to the members of the Ray Society. London: Dulau & Co., 25/- net.

imagined. We can safely say that we do not remember in recent years having seen anything like these for delicacy of colouring and minuteness of detail. We have recently had an opportunity of testing the plates by comparison with living examples of some of the species represented ; and the accuracy of the colouring and of the drawing was demonstrated.

#### A LANCASHIRE AND CHESHIRE NATURALISTS' UNION.

An effort is being made to form a Lancashire and Cheshire Union of Natural History Societies, on the lines of the Yorkshire Naturalists' Union, and towards this end Mr. E. Ranson, of 174 Willows Lane, Accrington, has issued a circular to various societies in the two counties, convening a meeting to be held in Manchester shortly. It is quite possible, however, that there are some societies with which he is not acquainted, and the secretaries of these, as well as anyone interested in the movement, are requested to communicate with Mr. Ranson on the matter. We also learn that it is proposed to revive the 'Lancashire Naturalist' in April, at 4d. per month. If the suggested Union becomes an accomplished fact, and the 'Lancashire Naturalist' becomes its official organ, it should have a longer lease of life than its predecessor.

#### LIVERPOOL GEOLOGISTS.

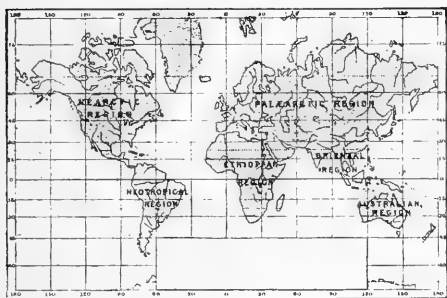
The Liverpool Geological Society has issued its volume of Proceedings for 1907-8, and it contains a useful record of local work, and two papers, the work of members, have reference to field work afar off. Dr. Dwerryhouse also contributes his Presidential Address to the Society. There are two important papers on the Trias, one on 'The Mineralogical Constitution of the Storeton Sandstone,' by J. Lomas ; and the other on 'Some Markings, other than Footprints, in the Keuper Sandstones and Marls,' by Mr. H. C. Beasley. Mr. Mellard Reade has watched the construction of a new Sewer Outfall, and as a result is able to give some useful notes on the Post-Glacial beds at Great Crosby ; with lists of foraminifera by Joseph Wright. Together with Mr. P. Holland, Mr. Reade gives some Analyses of Longmyndian Rocks. Mr. T. H. Cope writes some notes on some remarkable 'Comparisons in the Weathering of Basalt,' and Mr. Lomas writes on Marine Peat at Liverpool. A melancholy interest attaches to this volume. It is the last one in which the name of Mr. Joseph Lomas,<sup>‡</sup> who



has done so much for the Society, and for geological science, will appear in the list of members. His recent lamentable death in a railway accident in Algeria, where he was carrying out some geological work, will be deplored by many besides his Liverpool colleagues.

#### LABELS SHEWING GEOGRAPHICAL DISTRIBUTION.

With the kind help of Mr. H. B. Browne, M.A., the collection of exotic Swallow-tail Butterflies in the Hull Museum is being arranged, and with each species is being shewn a small map of the world, on Mercator's projection, upon which the distribution of the species is indicated in red. In this way the localities in which the various forms occur can be seen at a glance. The maps are of the size here given, and have a place left



in which the name of the specimen, or other information, can be inserted. It can, of course, be used for various other natural history objects. The map is really similar to the well-known distribution labels which are such a feature at the Manchester Museum, but are on a reduced scale. The publishers of this magazine are prepared to supply the maps to our readers, on a good white card. For particulars see our advertisement columns.

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Friends of the late Mr. Joseph Lomas will doubtless welcome the opportunity of subscribing to a memorial fund which is being raised for the benefit of his wife and children. As will be seen from another page in this issue, Mr. Lomas was killed in a railway accident in Algeria while on his way to study the rocks in the desert region of North Africa, this investigation being undertaken for a committee of the British Association. The devotion to scientific work which characterised Mr. Lomas meant the sacrifice of time and means that might otherwise have been more selfishly used. It is not surprising, therefore, to know that he was unable to make adequate provision for his wife and children. We hope there will be a generous response to the appeal which has just been issued by a committee which includes the names of many distinguished men of science. Subscriptions should be sent to the hon. treasurers, 'Lomas Memorial Fund,' Education Committee, 14 Sir Thomas Street, Liverpool.

## THE GARGENY BREEDING IN EAST YORKSHIRE.

W. H. ST. QUINTIN, F.Z.S.,  
Scampston, E. Yorks.

It is, I think, worth recording that in May last, an entirely wild pair of Gargeny Teal bred in this parish. The nest was under a wild rose bush, at the edge of a small willow garth, which is bordered by an open drain communicating with the river Derwent less than half a mile away. One of our farmers reported that a small duck was sitting there, and as it was in rather a dangerous place, my keeper lifted the eggs, thinking they were those of a Teal. The duck was flushed, but was not identified at the time. I am unfortunately unable to state the number of eggs, but I believe that there were eight. From these six young were reared, which turned out to be four drakes, and two ducks, and are now on the water here. I have had a single female Gargeny for several seasons, and this spring I provided her with a mate. On May 19th the latter was driven off by a wild drake of the same species, which suddenly appeared. He paired with the pinioned bird, and the alliance resulted in a nest, from which four young were hand reared. On May 27th the wild drake was beginning to go out of colour. By June 12th the pinioned duck was sitting, and her mate had disappeared. The wild bred ducklings were considerably older than the tame ones, and no doubt the full-winged drake was the father of the two broods, and when his first mate began to sit, he took to roving, and came across my tame bird, and paired with her.

### LEPIDOPTERA.

**The Death's-head Moth at Rydal.**—Mr. Hope's notes on the appearance of *A. atropos* around Carlisle coincide with mine for Rydal. Last year (1908) one was brought to me on October 10th, and the year before one on about October 15th. Both had come into houses.—MARY L. ARMITT, Rydal.

—: o :—

### ZOOPHYTES.

**Zoophytes in the Humber.**—With further reference to my note in 'The Naturalist' for December, I am now able to add *Gonothyraea hyalina*, a species which has been identified for me by Mr. J. Ritchie, of the Edinburgh Museum.—J. THOMPSON, Hull.

# THE ROCK-SOIL METHOD AND *BALLOTA NIGRA* LINN. IN LINCOLNSHIRE.

REV. E. ADRIAN WOODRUFFE-PEACOCK, F.L.S., F.G.S., ETC.

THE single sheet, 3 by 3.75 inches, made of collecting notes on every circumstance of plant growth, I named the Rock-Soil Method, in honour of Mr. Clement Reid for his book on "The Origin of the British Flora." He practically deals with quaternary rock-soils of various ages in the same way that I work them when they have been exposed by elevation and modified again by denudation and plant growth.

As a typical instance of a rather difficult species to analyse, let us take *Ballota nigra*. It is pre-glacial at Pakefield\* but rare. It was recorded for Lincolnshire by Rev. J. Dods-worth in 1836, Sir Charles Anderson in 1847, and H. C. Watson in 1851; and many times since. It is found in all our eighteen natural history divisions.

The following is its Rock-soil range, as far as it has yet been worked out on some 150 sheets:—

1. Blown Sand .. .. .	9	14. Lower Lias Clay .. .. .	3
2. Carstone .. .. .	1	15. Marine Sand .. .. .	3
3. Chalky Boulder Clay ..	12	16. Marlstone .. .. .	1
4. Cornbrash .. .. .	4	17. Old River Gravel .. .. .	3
5. Estuarine Alluvium .. ..	9	18. Oxford Clay .. .. .	4
6. Fen Gravel .. .. .	6	19. Peat (Cultivated) .. ..	2
7. Freshwater Alluvium ..	1	20. Purple Boulder Clay ..	4
8. Hessele Boulder Clay ..	1	21. River Gravel .. .. .	5
9. Hibaldstow Limestone ..	8	22. Sandy Glacial Gravel ..	39
10. Kimeridge Clay .. .. .	2	23. Spilsby Sandstone .. ..	7
11. Kirton Limestone .. ..	2	24. Tealby Clay .. .. .	1
12. Lincolnshire Limestone ..	10	25. Upper Chalk .. .. .	2
13. Lower Chalk .. .. .	1	26. Very Chalky Boulder Clay	1

It has been found *flore albo* on Fen Gravel, Peat, River Gravel, Sandy Glacial Gravel, Lincolnshire Limestone, and Spilsby Sandstone. In the form *foliis variegatis* on Hibaldstow and Kirton Limestone. Its flowering† range extends from May 30th to November 25th.

It is plain at once that *Ballota* is a lover of warm, open, and limy soils. When the sheets of notes are analysed, the following points come out. It is a hedge and ditch side species, but it seems to prefer a bank to the flat in the proportion of

\* Journal Linnean Society, 1908, p. 218.

† By 'flowering' I mean when the stamens are shedding active pollen.

10 to 1. The sunny bank to the shady side of a road running east and west in nearly the same proportion. On sandy soils it seems to get away from the villages to a greater distance than on clays, but, to a certain extent, the rabbit may explain this. It extends from Cadney village along hedge and ditch banks on road sides as far as the Sandy Glacial Gravel extends in any direction. It is found in bushy ground in old quarries and gravel pits, and on the decaying mud capping of limestone walls. It is exterminated by stock in pasture, unless it is protected by *Urtica dioica* or by the fouling of the ground by rabbits. It is apparently never found in meadow. It is even sometimes eaten by cows when the much-loved *Lamium album* growing beside it remains untouched. It would seem all the same to be taken as a corrective or relish rather than as food. It may be rarely found far away from villages in the hedges of tilth. It is, however, found so rarely growing in open, that it would almost appear to be a shade species of bushy ground.

Apply the following common Botanical Categories to it.  
Followers of :—

1. Man.
2. Cultivation.
3. Commerce (the unusual flora of railways, canals and mills, etc., being so classed).

Frequenters of :—

4. Pasture.
5. Meadow.
6. Woodlands (open, close, old or new).
7. Hedges (distinguishing between roadside, grassland, and tilth hedges).
8. Roadsides (distinguishing those over grass or tilth).
9. Stream-banks (distinguishing between slow or rapid).
10. Moorlands (*i.e.*, where *Calluna*, *Erica*, *Pteris*, etc., are the predominant species).
11. Broken ground (whether natural, as on escarpments, stream-sides, or caused by man—but not for cultivation).
12. Lakes or ponds (noting inflows and outflows).
13. Streams (rapid or slow).
14. Sand-dunes (inland or marine).
15. Salt-marsh (natural or artificial).
16. Elevation (above Ordnance datum).

We find it may be classed as follows :—

1. For protection only.
4. Where protected only.
7. By roadside very common ; by grassland rare ; by  
tilth very rare.
8. Fairly common.
11. Quarries and gravel pits.
14. Marine, where there are comminuted shells, or the  
sea sand is slightly mixed with silt.
16. In Lincolnshire our greatest elevation is 550 feet  
only, and the soil pure chalk. *Ballota* under the  
circumstances, does not clearly find its altitude limit.  
In West Yorkshire, Mr. F. A. Lees now gives it a  
range of 0 to quite 600 feet, he writes to me.

To sum up, *Ballota* would appear to be areal\* in Lincolnshire, but it can only survive when unconsciously protected by man, for its natural requirements, a bushy, open, limy, lightly stocked soil is practically not to be found in this country. That it is also local-areal in its soil requirements I cannot deny. That it is extra-areal I cannot believe from my present information, for what advantage does it obtain from the neighbourhood of villages, but protection from the feeding of stock ? It certainly bears no relation to true (1) followers of man, like *Cheledonium*, *Hyoscyamus*, *Parietaria*, etc., or of (2) Cultivation, or of (3) Commerce. I must, however, own the exact position of *Ballota* is most difficult to determine. We are not helped in the least by what Mr. S. T. Dunn says of it† :—‘ A native of the Mediterranean region and Western Asia. In England and most of Europe it is a weed of hedges and waste places, showing preference for the neighbourhood of human habitation.’ What does such writing tell us of the conditions of soil, stocking, etc., of everything we require to form an accurate estimate of the environmental conditions of *Ballota* abroad.

The true fact about it is, that it seems to be influenced as to its present place of growth by a cause I have never met with referred to in floras. England was an open country, practically

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\* *Areal* means adapted to the environmental conditions of any given limit, field, village, county, or kingdom, without any suggestion of the original place or conditions of evolution, or method of reaching the locality referred to. *Local areal* means the same, limited by some condition or requirement of soil, moisture, stocking, etc. *Extra areal* means the species cannot, without *conscious* help on the part of man, survive in a limited local environment.

† ‘ Alien Flora,’ p. 151.

wholly unenclosed till 1800, but as heavily stocked as the circumstances would then permit of; or in other words, till the turnip and swede were introduced as field crops, and took their place in a recognised four years or longer rotation. As soon as huge flocks and herds were fed on roots during the winter, the whole ground could be systematically and regularly manured—then enclosure followed as a matter of course.

Now *Ballota* is not truly confined to village hedges and banks but to those suitable spots of the old enclosures, which immediately surrounded villages, into which the stock from the open commons was driven for security at night. Even where these originally small paddocks, of two or three acres, have been thrown together into large fields, there is no difficulty to the trained eye in recognising them from the new enclosures by the traces of old fences or ditches on the green sward, or from their peculiar fertility. It was on them our forefathers expended their lime dressings to counteract the heavy fall of manure they received nightly from flocks and herds. Had they not used lime continually, these paddocks would, sooner or later, have been poisoned for grass growth. There is a well-known law in such cases. First a pasture grows quantity at the expense of quality, then the herbage grows acid, and as the insoluble manure accumulates in excess the herbage becomes like that surrounding rotting dung-hills. It is then a poison to stock. Steady liming corrects this decline in quality.

Now *Ballota* is a lime lover we know. The 'Flora of West Yorkshire' settled that point, for Mr. F. A. Lees says:—'Common on the Permian limestone, rare off it.' We know also that one part of lime has a powerful action on 10,000 parts by weight of an ordinary agricultural soil. Cannot the presence of *Ballota* be explained to a certain extent by the agricultural necessities of past conditions? My notes suggest perfectly clearly that some such influence has been at work. It explains the presence of lime where *Ballota* is now found, whatever the rock-soil may consist of. It explains why it is never found in pasture unless protected, and how it would be soon exterminated in an unenclosed country outside the old village area, where stock we know from the manor records was never allowed to graze the hedge banks, road sides or ditches.\*

\* After I had gone to press with the typed copy of my *Ballota nigra* paper, I sent the original manuscript on to my friend Mr. F. A. Lees, who in turn sent it on to our mutual friend Canon W. Fowler.

[ Mr. F. A. Lees writes, commenting on my *flora albo* records :—' There

is a sub-species, *Ballota alba* Linn., most certainly introduced at some time.' I have no fault to find with this note, which had slipped me, but the nomenclature that underlies it is Linnean and not twentieth century. The *flore albo* forms of *Ballota* are no more 'off type' than the white *Viola odorata* L., which is commoner in Cadney than the usual type colour, yet is otherwise just the same. A return to such a system of nomenclature 'spoils' our chance of discovering the cause of these colour changes in plants. For instance, I have only once found the white-flowered form of *Cnicus lanceolatus* Willd., in my life. It was in an old pasture where *C. arvensis* Hoffm., and *C. palustris* Willd. were both found *flore albo*, in the same limited area too. There is a specimen in the county Herbarium at Lincoln of *Ononis spinosa* Linn., which was of the most lovely deep blue, sent in by the Rev. W. H. Daubney, while it was still quite fresh and brilliant in colour. It was the only plant growing in a large area of the type colour. Surely after the evidence of any ordinary plant collector's experience, or the production of the Shirley poppy, no one wants evidence that colour forms arise suddenly and continue indefinitely.

Vincent Bacon, F.R.S., Surgeon and Apothecary of Grantham, on October 1st, 1726, recorded in Martyn's Botanical Society of London, *Ononis spinosa flore albo* by the roadside from Ropsley to Boothby. It is found there to-day.\* Patrick Blair, M.D., recorded *Epilobium hirsutum flore albo* for Bolingbroke in 1723; it is also there to-day † I have, however, direct proof of the 'spontaneity' of colour change in *Ballota nigra* under my own eyes. In 1906 a clump which had till then been typical in colour became white, and has remained so till now. Since I went to press Miss S. C. Stow has sent me a record which looks uncommonly like another case—' *Ballota nigra flore albo*, one specimen, wall bank, Ropsley village, on Lincolnshire Limestone.' There can be no doubt, as Canon Fowler suggests, that variegated leafage, such as is found in *Ballota*, arises in part from 'irregular nutrition, too soon wet and dry again.' White flowered or unusual colour forms, I believe, arise from a similar but not like cause.

Canon Fowler also suggests that plants, like *Ballota*, veritable 'children of the sun,' with an unusually long flowering range, may be 'triple brooded like some insects.' I have tried to think of everything in making notes, but have never thought of that point before, so cannot say for certain. I will keep some clumps under special observation next summer, to find out whether this is so. If this species is fertilised only by bees, its later flowers must be barren, which is not my experience. I regret to say I have no insect notes on *Ballota*. No doubt the Canon is right in suggesting that *Ballota* 'loves shelter from wind, and this is the reason it is a bushy ground or hedgeside species in our area.' Its exact position as a local-areal or extra-areal species can only be finally settled when its position in other counties has been as fully worked out as with us in Lincolnshire.

In giving illustrations of 'followers of man' in my last paper, I was only referring to Lincolnshire. *Parietaria*, for instance, I have proof is 'wind sown,' and 'water carried' here, but only very locally. I have plenty of proof it is purposely 'carried by man.' The following extract from 'Between Trent and Ancholme' ‡ is a fair case in point: 'The original Pellitory and wild Wall-flowers, upon the walls and everywhere, were brought as tiny seedlings from Thornton College ruins, and were associated at the time with Sir Walter's 'Edie Ochiltree, in the ruins of St. Ruth. 'Thae smell sweetest by night-time, thae flowers, and they're maist aye seen about ruined buildings . . . I'm thinking they'll be like mony folk's guid gifts, that often seem maist gracious in adversity.' *Parietaria*.

\* 'Naturalist,' 1898, p. 178.

† 'Naturalist,' 1894, p. 338, and 1897, p. 140.

‡ No author's name. Messrs. Jackson & Sons, Brigg, 1908, p. 35.

is clearly extra-areal in Lincolnshire, though no doubt areal in England among rocks, such as we do not possess in this county.

Mr. Clement Reid, F.R.S., also most kindly writes:—‘This plant—*Ballota nigra* Linn. has always interested me, and I was a good deal surprised when it turned up in the Cromer Forest Bed. However, at that period the British climate was probably drier than now, though up till now very few of the prairie-plants have been found.

‘You may be interested to know that *Ballota* occurs not uncommonly in Roman Silchester; and I think also in Roman Caerwent, though the specimen is too badly preserved for certainty. Silchester is on a gravel soil over Bagshot Sands; but there is a great deal of lime-rubbish about the Roman town—cement, stucco, etc.

‘I cannot say that I feel very sure that *Ballota* may not be one of the plants introduced in Roman times, for the only places where I found it away from habitations and cultivated land are on old shelly beaches, and by the shores of harbours, on steep banks. Still if the plant could live under other conditions than those you give I think that 1800 years is plenty of time for it to spread—the *Linarias* and *Veronicas* have no difficulty in spreading.

‘In 1907 I found *Ballota* growing under exceptional conditions in Cornwall. There is a large field close to Wadebridge, attached to an old manor house, and out of cultivation for many years. The whole of this field is dotted with tufts of *Centaurea scabiosa* and *Ballota* mixed. This is so unusual that I tried to make out whether there was anything special in the geology to account for it; but it seemed to be merely ‘rough pasture on a thin soil overlying the ordinary non-calcareous slate of the country.

‘However, there was formerly an enormous trade in shell sand for manure between Padstow and Wadebridge, and possibly this field may have been either heavily dressed, or have been one of the dumping places for heaps of sand. The field, however, if I remember rightly, must be at least two acres. It has sufficient slope to drain it well.’

I do not suppose for one moment that *Ballota*, or any species of like requirements, can have existed in Lincolnshire through glacial times. I doubt whether such plants could even exist in Cornwall, but am in no position to give an opinion. Mr. Clement Reid, in a letter says, ‘It does not seem probable that *Ballota* can have lived through the glacial period in any part of the British Isles.’ I believe the pre-glacial flora in Lincolnshire was wholly destroyed. The point is that what had once been could exist again, if the climate were approximately the same.



## MOLLUSCA.

*Pisidium supinum* Schmidt. (= *P. conicum* Bandon), etc., in Lincolnshire.—Whilst searching for *Pisidia* at the confluence of the river Brant with the Witham (div. 13 W.), on July 24th, 1908, I took the above shell, making a new record to the county list. Also on the 15th of the same month, at Skirbeck, Boston (div. 12), Mr. Birchnall and myself obtained some very characteristic forms of *Planorbis spirorbis* Müll. var. *leucostoma*. Mr. J. W. Taylor has been kind enough to verify the above specimens.—JOHN F. MUSHAM, Lincoln, December 23rd, 1908.



## A YORKSHIRE BOTANIST.

RICHARD SPRUCE (1817-1893).

HAD Spruce been consulted, he could not have desired a more fitting monument to his memory, than the two handsome volumes\* now before us. And 'tis a great compliment to this Yorkshire botanist, and to Yorkshire, that a record of his life and work should be given to the world by Dr. Alfred Russel Wallace.

This memorial, though late in its appearance, is not the less welcome. It has a charm about it which recalls the substantial volumes of natural history travel of thirty or forty years ago.

Besides being a keen botanist, Spruce was a good 'all round' man, and recorded many interesting observations in other branches of knowledge. He also had a fine literary style, which makes a perusal of his notes a pleasure.

In his preface, Dr. Wallace writes: 'Shortly after Spruce's death, I offered to do what I could to put together a narrative of his travels from his journals and letters, if, on examination of the materials, it seemed possible to do so. His executor, Mr. M. B. Slater, was anxious that I should undertake the duties of a literary executor; but, partly owing to both of us being fully occupied by our own affairs, it was only after a delay of eleven years that I was able to begin the preparation of the present volumes.' Since then, Dr. Wallace has spent three years in preparing the work for the press.

It is thus pleasing to find that another well-known and respected Yorkshire botanist, Mr. M. B. Slater (happily still with us), has had a hand in the preparation of this work. Spruce was Mr. Slater's first master, and Mr. Slater wrote: 'From him I got to know how to use a microscope, and thus got my first knowledge of the beauties of the mosses, and I can truly say their examination and study has been a source of great pleasure to me through life.' † Mr. Slater was fortunate in being a pupil of Spruce, and for some years previous to 1846. paid him weekly visits. Mr. Slater has favoured the writer

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\* Notes of a Botanist on the Amazon and Andes, by Richard Spruce, edited by Alfred Russel Wallace, O.M., F.R.S., with a Biographical Introduction, Portrait, seventy-one illustrations, and seven maps. 2 Vols., 518 and 542 pages. London: MacMillan & Co. 21/- net.

† In the 'Introduction' to 'The Mosses and Hepaticæ of North Yorkshire,' in J. G. Baker's 'North Yorkshire,' 2nd ed., 1906, pp. 424-5.

with a sight of some of Spruce's letters,\* each of which at once betrays his keen powers of observation. The first of them was written so long ago as 1847, when Spruce was preparing to issue his collections of Pyrenean Mosses and Hepaticæ. It is written in a small but fine hand, and, as with all his writing, most easy to read—not always a characteristic of a naturalist's handwriting! We quote the letter, as it not only gives information as to Spruce's methods, but probably also gives some indication of the way in which Mr. Slater first took up the study of mosses, with such good result:—

'As you were kind enough to say that you could fasten down for me the specimens of a set of my *Musci Pyrenaici* I herewith send one for that purpose.

I have gummed down a few of the topmost specimens, in order that you may judge how to do the rest. It is the best way to fasten down first the labels (by gumming them on the left side only), and afterwards the specimens. There are usually four specimens in each sheet of coarse paper, and when you have gummed these it will be advisable to apply a little pressure to them by means of sheets of drying-paper laid on them, or otherwise. Wherever you find *loose calyptræ* laid, they will require to be attached to the paper over the tops of any of the capsules.

If you apply your lens to any of the species which are new to you, as you go along, you may thereby attain a very fair idea of their outside appearance (at least).

To fasten down a set like this occupies me from two to three days, working at it all day. If I ask you to let me have it in a fortnight, you will, I suppose, easily finish it by taking an hour whenever you think you could not better employ it.'

Born at Ganthorpe, near Castle Howard, the son of a schoolmaster, Richard Spruce also began his career as a schoolmaster at Haxby, and was later at the Collegiate School at York, until it closed in 1844. From his earliest years, however, he developed a love for botany, and in 1837 he drew up a list of the flowering plants of the Malton district, comprising 485 species.† In 1841 he wrote his first paper on 'Three Days on the Yorkshire Moors,' which was printed in 'The Phytologist.' Subsequently numerous papers appeared from his pen, a complete list of which is given by Dr. Wallace.

Spruce's first long journey was to the Pyrenees, the published results of which brought him into contact with most of the leading botanists of his day. His greatest achievement in the way of publications, however, was his 'Hepaticæ of the Amazon and the Andes of Peru and Ecuador,' in 1885. This consisted of 600 closely-printed pages, and contained descriptions of over 700 species and varieties, mostly collected by himself, of which over 400 were new to the science.

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\* One of these, dated 1879, the present writer is permitted to retain. It has a reference to 'The Naturalist.' † This is in Mr. Slater's possession.

At home, Spruce accomplished much, not the least interesting being the discovery and identification of a new plant to the British Flora, *Carex paradoxa*. Amongst his many other works we notice one 'On Cephalozia : its sub-genera and its allied genera' (1882), this being the fore-runner of the large work just referred to. It contained 100 pages, and was printed in Malton. This is really a key to his arrangement of the Hepaticæ which is now generally followed.

The following extract, given by Dr. Wallace from one of Spruce's letters, is, like many others, worth quoting in these columns :—

'On our own moors I have far oftener seen *Odontoschisma Sphagni* growing on *Leucobryum glaucum* than on Sphagna. Now that the steam-plough is fast obliterating the small remnant of moors in the Vale of York, it is worth while recording something about the *Leucobryum*, as seen on Strensall Moor, five to six miles north of York. There it forms immense rounded hassocks, some of which in my youth were as much as three feet high ; and although the ground whereon they grew is now drained and ploughed out, I am told that on another part of the moor there are still left a few hassocks about two feet high. When the late Mr. Wilson first saw them, thirty years ago, he took them at a distance for sheep ; as he approached them he changed his mind for haycocks ; but when he actually came up and saw what they were he was astonished, and declared he had never seen such gigantic moss-tufts elsewhere. During seven consecutive years that I saw them frequently, I could observe no sensible increase in height. The very slight annual outgrowth of the marginal branches is comparable to the outermost twigs of an old tree, and is almost or quite counterbalanced by the soft, imperfectly elastic mass incessantly decaying and settling down at the base ; so that these tufts of *Leucobryum* may well be almost as secular as our Oaks or Elms ; and some of them might even be coming into existence, if not so far back as when the warders of Bootham Bar and Monk Bar (the northern entrances to York) used to hear the wolves howling beneath their feet on the bleak winter nights, at least while the 'last wolf' was still prowling in the Forest of Galtres.'

In 1869 he wrote a letter in which he stated 'One day last week a dentist relieved me of four teeth, and I now belong to the genus *Gymnostomum* ; but by the time you come over I hope to have developed a complete double peristome.'

As we know more of the life Spruce led, the more do we appreciate his worth. He was never wealthy, often very poor ; and for a great part of his life was a martyr to an internal disease, which necessitated his reclining on a couch. During the last thirty years of his life, he lived some time at Welburn, and later in a small cottage at Coneysthorpe, near Malton ; his 'world' being a sitting room, twelve feet square, and a bedroom of equally limited proportions. In this small room he was visited by many of the leading scientific men of his day, and from it he corresponded with the botanists of all parts of the globe.

Amongst the material left by Spruce when he died, was a large account book, in which had been carefully written eight chapters of 'Notes of a Botanist on the Amazon and Andes, being records of travel on the Amazon and its tributaries, the Trombetas, Rio Negro, Uaupés, Cosiquiari, Pacimoni, Huallaga, and Pastasa ; as also to the Cataracts of the Orinoco, along the eastern side of the Andes of Peru and Ecuador, and the shores of the Pacific, during the years 1849-1864.' Dr. Wallace informs us that with considerable condensation, this constitutes the first six chapters of the present work. The 'condensing,' however, has been achieved by omitting geographical and historical items of little general interest. Otherwise the narrative is exactly as Spruce left it, his north country or archaic words and expressions being preserved, though these were often 'queried' by the printer's reader. The value of the narrative has been increased by the insertion, in square brackets, of explanatory notes by Dr. A. Russel Wallace. This editor has also, for the convenience of non-botanical readers, placed lengthy passages of purely botanical, etc. nature, in smaller type, so that the general reader will readily know which portions to 'skip.' The illustrations are mostly from Spruce's own drawings. There is an excellent portrait of Spruce as a frontispiece, and a complete list of his works is also given, together with a biography.

Perhaps the greatest recommendation we can give to these two volumes is the following expression of its value by Dr. A. Russel Wallace, than whom we could have no better authority : 'I have myself so high an opinion of my friend's work, both literary and scientific, that I venture to think the present volumes will take their place among the most interesting and instructive books of the nineteenth century.'

And what could be more appropriate for these volumes, than the following well-known lines by Byron :—

To sit on rocks, to roam o'er flood and fell,  
 To slowly pace the forest's shade and sheen ;  
 Where things that own no man's dominion dwell,  
 And mortal foot hath ne'er or rarely been ;  
 To climb the trackless mountain all unseen,  
 With the wild flocks that never need a fold ;  
 Alone o'er crags and foaming falls to lean ;  
 This is not solitude ; 'tis but to hold  
 Converse with Nature's charms, and view her stores unroll'd.

Sir Joseph Hooker stated, 'Spruce's monumental work "*Hepaticæ Amazonicæ et Andinæ*," is his crowning one that will ever live.'

T. S.

## THE MIGRATORY MOVEMENTS OF CERTAIN SHORE-BIRDS AS OBSERVED ON THE DUBLIN COAST.\*

C. J. PATTEN, M.A., M.D., Sc.D.

HAVING for several years made observations on the migratory movements of shore-birds on the Dublin coast, and having selected that coast this season as a holiday resort for the purpose of carrying out further research, it occurred to me that a paper dealing with the above subject might prove of interest to some members of the British Association, seeing that it assembles in the Irish Metropolis this summer.

After visiting many parts of the Irish sea-board, I may say that I think it would be hard to find a better observatory for the purpose of recording the arrivals and departures of numerous species of shore-birds than the coast of Dublin. By this, I mean not only Dublin coast proper, which bounds the estuary of the River Liffey, but also those extensive flat beaches north of the city which form a feature of the coast-line of the rest of the county.

While the greater part of this coast is prolific in bird-life during the Spring and Autumn migrations, nowhere have I been able to make better observations, or obtain a larger list of birds than along the flats of the north side of the estuary of the River Liffey, the further end of which is intersected longitudinally by a series of sand-dunes which, uncovered even at high water, form an island now connected with the road by a bridge. Hence, these sand-hills are accessible in all conditions of the tide, and with the surrounding beach, they constitute what is known as the 'North Bull.' The richness of the avifauna about here depends largely on the great extent and diversified nature of the soil, which yields an abundant and varied mass of food-stuffs, and also on the shelter secured by the Hill of Howth, which acts as a gigantic break-water against the fury of wind and wave. The sand-dunes, as they face Dollymount, are fringed with pasture-land, which, as it meets the sand, becomes damp and broken up into small grassy knolls, and intersected with gullies into which the tide flows. On these clumps many wading-birds congregate during

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\* Read at Section D., British Association, Dublin Meeting, September 2nd to 9th, 1908. An abstract of this paper will appear in the Official Report of the British Association, 1908.

high water. The beach inside the sand-dunes, *i.e.*, between the sand-hills and the road at Dollymount is composed of soft estuarine mud, thickly top-dressed with slimy green seaweed, and forms a feeding-ground for numbers of 'waders'. On the far side of the sand-hills, a charming beach presents itself, where the sands, covered at full tide by the open sea, are ribbed and firm. Some shore-birds, notably the Sanderling, prefer this ground. Here, then, it is seen that within the confines of one area, which, when the tide is out, measures roughly three-miles in length by one in breadth, an excellent *natural habitat* is afforded.

Having already incorporated a considerable amount of information in my work on 'The Aquatic Birds of Great Britain and Ireland,' published at the end of the year 1906, it seems unnecessary to overload this paper with statistics; indeed, to avoid going over old ground, I purpose dealing only with a small number of species, which may be regarded of special interest, because of the increased information which I have been able to secure regarding their movements.

To give one an idea of the number of different kinds of *Limicoline* birds alone which are included in the avi-fauna of the North Bull, I here append a complete list, all of which I have observed:—

Great Plover ( <i>Oedichnemus scolopax</i> )	Purple Sandpiper ( <i>Tringa striata</i> )
Ringed Plover ( <i>Aegialitis hiaticola</i> )	Knot ( <i>Tringa canutus</i> )
Golden Plover ( <i>Charadrius</i> <i>pluvialis</i> )	Sanderling ( <i>Calidris arenaria</i> )*
Grey Plover ( <i>Squatarola helvetica</i> )*	Ruff ( <i>Machetes pugnax</i> )
Lapwing ( <i>Vanellus vulgaris</i> )	Common Sandpiper ( <i>Totanus</i> <i>hypoleucus</i> )
Turnstone ( <i>Strepsilas interpres</i> )*	Common Redshank ( <i>Totanus</i> <i>calidris</i> )
Oyster-catcher ( <i>Hæmatopus</i> <i>ostralegus</i> )	Spotted Redshank ( <i>Totanus fuscus</i> )
Avocet ( <i>Recurvirostra avocetta</i> )	Greenshank ( <i>Totanus canescens</i> )
Grey Phalarope ( <i>Phalaropus</i> <i>fulcarius</i> )	Bar-tailed Godwit ( <i>Limosa lap- ponica</i> )
Jack Snipe ( <i>Gallinago gallinula</i> )	Black-tailed Godwit ( <i>Limosa</i> <i>belgica</i> )
Common Snipe ( <i>Gallinago coelestis</i> )	Curlew ( <i>Numenius arquata</i> )
Dunlin ( <i>Tringa alpina</i> )	Whimbrel ( <i>Numenius phæopus</i> )
Little Stint ( <i>Tringa minuta</i> )*	
Curlew-Sandpiper ( <i>Tringa subar- quata</i> )	

Only those species to which an asterisk is suffixed will be dealt with here.

I do not intend to touch upon Web-footed birds in this paper, but may say in passing, that of the orders *Anseres* and *Gaviæ*, large numbers of species are to be found in this vicinity.

GREY PLOVER (*Squaterola helvetica*).

Rather too much emphasis is laid on the fact that the Grey Plover is a noisy shore-bird, so much so, indeed, that frequently its presence is not sought in early autumn because its whistle is not heard. I believe that the adult birds, which arrive about the middle of October and later, are much more noisy than the immature birds. I have often watched, and crept quite close to immature Grey Plovers, which, on becoming aware of my near presence, flew away without a sound. The very tame immature birds which are occasionally met with are, as a rule, silent. From repeated observations I am of the opinion that flocks continue to arrive and move southward during September and early October, and that the numbers, chiefly late comers, which remain during the winter, are proportionately small. With regard to the apparent scarcity of the bird as a vernal migrant, I am not satisfied. Considering that it is on the whole more abundant during autumn on the east side of Ireland than on the west, one would expect to meet it on its return journey in greater numbers on the Dublin coast than have hitherto been recorded. That it does visit the Irish coast in considerable numbers in Spring is evident from Mr. Robert Warren's data (Ussher and Warren's 'Birds of Ireland,' pp. 256-257). The few birds which may be seen in late summer (August) in apparent nuptial or transitional plumage, are probably those which, not breeding, remained on our shores after their companions had travelled northward.

TURNSTONE (*Streptilas interpres*).

I am now satisfied that the Turnstone, apparently in adult plumage is to be found regularly throughout the year along the Dublin coast. Nevertheless, though I have examined an adult female (procured on July 18th, 1900, by the late Mr. E. Williams) containing ripe ova, the inference can hardly be made that the bird was breeding in the locality. For it was without a mate, nor indeed have I as yet discovered this species in distinct pairs, and showing the signs of anxiety which one might expect if the nesting-site was being approached. However, from recent data afforded regarding its appearance in adult-like plumage at the height of the breeding season, it is not altogether improbable that we may yet claim this species as indigenous rather than merely migratory. From July to October this bird is plentiful on the North Bull, gathering in flocks of twenty to forty, which somewhat diminish in number

in winter, due partly to scattering, and partly to the migration of some of the birds southward. It still continues plentiful as a vernal migrant during May and June.

LITTLE STINT (*Tringa minuta*).

Though I have regarded the Little Stint as an irregular autumnal visitor to the flats of Dublin Bay, not appearing during certain years ('Irish Naturalist,' 1898, p. 234, and *ibid.* 1899, p. 254), I have more recently felt inclined to modify somewhat this statement, and look upon the species as probably occurring every year in the locality in question. This is the view which I have ventured to give in my 'Aquatic Birds,' p. 295, regarding its appearance on the coast of Ireland generally, 'but in varying and limited numbers.' I must admit that I have not seen it for some seasons past, but then my recent visits have been of very brief duration, and I have not had opportunities as in former years of making almost daily visits during September, the month in which this species usually appears on the Dublin coast.

Granting, however, that one had these opportunities, it is an easy matter to overlook this bird, for its visits are only passing; indeed, I believe it is a matter of its being *here to-day and gone to-morrow* in most instances, so that it is obvious how many birds are altogether missed. Further, while it may consort with large flocks of Dunlins and other shore-birds on the open strand, yet, in my experience, it is also very partial to little grass patches and the edges of pools, where it occurs singly or in pairs. This, coupled with its great tameness when away from the company of more wary birds, gives the Merlin a greater chance of picking it up; indeed, the frequency with which this Falcon surprises and captures small shore-birds on the grass patches of the North Bull is remarkable; a greater proportion of birds losing their lives in this way, than when they are pursued in flocks over the open slob-land. Indeed, the presence of a flock seems to thwart the falcon, as may be seen by the time taken to single out the victim and capture it. And thirdly, numbers of shore-shooters frequent the North Bull during September, when the migrants are tame, and it is quite likely that Little Stints are shot occasionally which, with a bag full of Dunlins, are included as Sand-larks for to-morrow's pie.

Regarding the occurrences of this bird during the past two seasons, I have been informed that it has been seen, but no specimens were secured.

(*To be continued*).



# WASPS AT WEST AYTON, YORKS.

REV. W. C. HEY, M.A.

OF the seven British species of *Vespa*, six occur in Yorkshire. It has often been stated that the Hornet (*V. crabro*) is a Yorkshire insect, but this mistake is probably due to the fact that the country people generally call the Tree-wasps, Hornets.\* Of the six Yorkshire species of *Vespa*, five are more or less common at West Ayton, but I have failed so far to detect *V. austriaca*, an inquiline species, parasitic on *V. rufo*.

## VESPA VULGARIS L.

The commonest wasp, which so often enters our houses in search of sweets. The queens were singularly abundant in April 1908, and often came to an old summer-house in my garden to gnaw wood for their nests.

## VESPA GERMANICA Fab.

This wasp also often enters houses, and is very common. The queens, of which I observed an extraordinary quantity at West Ayton during the spring of 1908, are very large and handsome insects, and it is a beautiful and interesting sight to watch them performing their toilet in April sunshine. The most trustworthy distinction between *V. vulgaris* and *V. germanica* is in the shape of the yellow lines upon the thorax. In *vulgaris*, these lines are parallel-sided, in *germanica*, they have a decided tendency to flow outwards. The black markings on the clypeus and abdomen have been made too much of as specific distinctions.

## VESPA RUFA L., sometimes called the 'Anchor-faced' wasp.

This wasp is fond of flowers, and was especially attached to species of *Centaurea* in my garden. It also affected *Cotoneaster*, *Symphoricarpos*, and *Pyrus japonica*.

## VESPA SYLVESTRIS Scop.

This species and *V. norvegica* are structurally very distinct from the three former species, as they possess a long cheek between the eye and the mandible. *V. sylvestris* seldom comes near houses. Its favourite plant is the Figwort. In the 'carrs' below Ayton is a ditch, thickly bordered with Figwort, and here this wasp abounded. In September, the male

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\* *Vespa crabro*, Mr. W. D. Roebuck says (Victoria History of Yorkshire, vol. i., p. 217), has undoubtedly occurred in Yorkshire at York, near Wakefield, and at Beverley.—G.T.P.

occurred on the same plant in Forge Valley. The clear yellow face of this species easily distinguishes it from *V. norvegica*, which is strongly and peculiarly marked with black on the clypeus.

#### VESPA NORVEGICA Fab.

This wasp appears to be earlier than the other species. I have several times seen the queens abroad in my garden on sunny days in January. Last July the males were already abroad in the flowers of Cow-parsnips near Hutton Buscel Moor. I have not met with the males of any other species before September. This wasp is particularly fond of the flowers of the snowberry, and occurred on them in great numbers in the garden of a farmhouse on Seamer Moor. The globular nests of this species have several times been formed in my garden, in a gooseberry bush, in a pear tree, and under a seat.

My quest after the smaller wasps has not been very successful, as I can only record two species of *Odynerus*.

#### ODYNERUS PARIETUM L.

On flowers of *Centaurea* and *Epilobium* in my garden, plentiful.

#### O. PARIETINUS L.

Also in my garden about pear trees and snowberry, less common.

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### BIRDS.

**White Starling at Ripley.**—An interesting variety of the Starling was obtained at Ripley in April last. The plumage is quite white, the legs and bill light stone colour, and the eyes black.—R. FORTUNE.

**Red Throated Diver at Grassington.**—In December last a fine specimen of this species was obtained at Grassington, near Skipton, on the River Wharfe. It measured 2 ft. 2 in. in length, beak  $2\frac{1}{2}$  in., width (expanse of wing) 3 ft. 3 in., tarsus 3 in., weight 3 lbs. 9 oz.—WALTER WILSON, Skipton-in-Craven, January 4th, 1909.

**Fork Tailed Petrel near Doncaster.**—I learn from Mr. W. E. Cox, of Sandall Grange, Doncaster, that a Fork Tailed Petrel was picked up on the high road by one of his men on Oct. 9th. It was kept alive for several days, being fed on fish and bread, the latter a very unsuitable food. It is interesting to have this record coming so close to the Barnsley one.—R. FORTUNE.

## THE CHANGING DISTRIBUTION OF THE LONG-TAILED TITMOUSE IN THE WEST RIDING.\*

HARRY B. BOOTH, M.B.O.U.

MESSRS. CLARKE AND ROEBUCK, in their 'Vertebrate Fauna of Yorkshire,' say that prior to 1881, the Long-tailed Titmouse was a resident, generally distributed and fairly common, most frequently seen in autumn and winter.' Mr. T. H. Nelson, in 'The Birds of Yorkshire,' 1907, says exactly the same thing, but adds—'during the breeding season it is rather locally distributed.' Mr. Nelson also gives the first reference to the bird in the county from North Bierley, Bradford; when, in the year 1713, Dr. Richardson described as that of the Goldcrest, a nest which was referable to the species under discussion. This is interesting because it refers to part of the district to which these notes chiefly apply, viz., the drainage area of the river Aire above Leeds, and the drainage area of the river Wharfe above Otley. Twenty years ago the Long-tailed Titmouse bred regularly in small numbers in both these areas. In 1889 I found nests both in upper Airedale and in upper Wharfedale, and it probably nested there until a few years later. It was during the year 1895 that it first occurred to me that this species appeared to be absent from the district during the breeding season; but reflection and discussion revealed the fact that neither birds nor nests had been noticed during the previous two or three seasons.

It is much easier to note the advent than the exit of a rather uncommon small bird; because in the latter case, one's attention and curiosity is at once aroused, but continual observations have to be made over a considerable area before it is possible to state definitely that the species has ceased to occur in the district. However, from that time forward, a better look-out was kept, with the result that not a single nest is known to have been found since then.

On May 17th, of 1907, however, two adult birds were seen in Bolton Woods, but they were not seen again, although the spot was carefully searched just after by Mr. Roose. In the same year, two birds with a young family were noticed in the Skipton Castle Woods, by Mr. W. Wilson, where they were

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\* Read at a recent meeting of the Vertebrate Section of the Yorkshire Naturalists' Union.

presumed to have bred, but no signs of a nest could be discovered. So far as I am able to ascertain, these two reports are the only occurrences in the breeding season during at least the last fifteen years, notwithstanding the fact that a few years before the bird had nested annually in these districts. Neither has it favoured us much more with its presence during the autumn and winter. From the time of its ceasing to breed with us, its visits in the colder seasons have gradually become less frequent; until, at present, the Long-tailed Titmouse has almost ceased to visit us, and can be looked upon as a very uncommon bird in upper Airedale and in upper Wharfedale at any time of the year. It is difficult to assign any reason for this local change of habits and haunts, because in the neighbouring districts these birds are constant and not really uncommon. In the south of the Riding (south of Wakefield), they breed annually. In the north of the Riding they occur, and in April 1906, I was extremely surprised to see them so common near Sedbergh, where we found three of their nests in less than two hundred yards of one hedgerow. Mr. Fortune tells me that they still nest yearly in the Harrogate district, but he thinks in slightly decreasing numbers. I am informed that they are not uncommon to the east of Leeds.

The reasons for such important, though local changes in the habits and distribution of a species during recent years, is worthy of investigation. My object in recording these facts is that this species may be kept under more careful observation all over the West Riding, or better still, all over the county; the notes compared, and the results analysed. It is only by such general and systematic observations that the true local status of any species can be obtained. I am confident that if Yorkshire ornithologists will make special notes of their observations of the different species, and compare them; that the distribution of the vertebrate fauna of our county will be worked out much more thoroughly than that of any other county.

P.S.—Since the above paper was read, Mr. Thomas Roose, of Bolton Abbey, informs me that the last nest to be found 'was in May 1895, in a hazel bush, nine feet from the ground, and not far from the old wooden bridge in Bolton Woods.' Thus a single nest has occurred a little more recently than is stated in the above notes. Mr. Roose also puts the following significant question, which can scarcely be taken as the sole

cause, seeing that the same fact applies to the neighbouring districts, where the Long-tailed Titmouse still nests:—‘Can these Long-tailed Tits have been driven from upper Wharfedale by the overwhelming numbers of the other members of the Tit family? This is the only apparent reason for their disappearance that occurs to my mind, seeing that the others have increased so much.’

**The New Book of Animals.** New and Revised Edition, by **Horace G. Groser.** London: Andrew Melrose. 326 pp., 6/- net.

This is a large book, and printed in good, bold type, and is very cheap at 6/-. It deals chiefly with the Kangaroo, Buffalo, Lion, Tiger, Elephant, Rhinoceros, Gorilla, and other animals of particular interest to boys and girls, for whom it would make an excellent gift-book. The text is not too technical, and the illustrations are both numerous and good.

**The Country Home.** Vol. I., 1908. Constable & Co., 380 pp., 5/- net.

This attractive volume contains the first six monthly parts of ‘The Country Home,’ already referred to in these pages, and in its present form, is exceedingly useful as a present. It contains numerous well-illustrated articles, those having natural history inclinations, being ‘The Wild Cat,’ ‘The Flowers of Spring,’ ‘Galls and Gall Flies,’ ‘Nesting Boxes and Bird Tables,’ ‘The Stoat,’ ‘Snails,’ etc.

**The Moths of the British Isles.** Second Series, by **Richard South, F.E.S.** (Wayside and Woodland Series). F. Warne & Co., 1908. Price 7/6.

We hail with pleasure the appearance of this volume, which, called ‘Second Series,’ is, in reality, the second and concluding volume of the ‘Moths of the British Isles, or the third volume on the British Macrolepidoptera, the first one dealing with the Butterflies alone. As it is got up in the same way, and in precisely the same form as was the previous volume on the ‘Moths,’ little need be said in addition to what we wrote in the notice on it, which appeared in the ‘Naturalist’ of March 1908, p. 112; but the eulogium we passed on that volume can also be given to this. The volume before us treats of the remaining portion of the Noctuæ, followed by all the Geometræ, and finishing with the smaller groups of the ‘Burnets,’ ‘Clearwings,’ ‘Swifts,’ etc. Its ninety-six coloured plates contain natural size figures of 873 moths, and in addition there are sixty-three plates in black-and-white, containing 335 figures, chiefly of the eggs, larvæ, and pupæ. The plates in the two volumes on the ‘Moths’ contain the extraordinary number of 1208 figures, besides illustrations in the text pages. The black-and-white figures seem to be excellent throughout, and with a few exceptions, the coloured ones are equally good, though the ‘greens’ in the ‘Emerald’ moths are mostly too pale, and not sufficiently bright. The author, too, has evidently figured a specimen of a pale, but still brown-marked form of *Cidaria sufumata* as the ab. *porritii*, whereas the types from which Robson described and named the variety were practically black and white only, and quite unlike this figure, though, no doubt, the extreme limit of the form illustrated. There are also one or two ‘slips’ in the letterpress, as on page 114, where *Skipton* Common is given as a locality for *Acidalia straminata*, instead of *Skipwith* Common. This is unfortunate, as we scarcely expect to see *straminata* at *Skipton*. Elsewhere in the volume, too, *Skipwith* is printed as *Skipworth*; and there is clearly something wrong in the second paragraph on *Catocala fraxini* at page 79. But altogether, errors are remarkably few, and the three daintily elegant volumes together now form a cheap but reliable work, by means of which any young beginner ought to make progress in the study of the macro-lepidoptera far more rapidly than could have been done, even but a few years ago.

G. T. P.

## In Memoriam.

JOSEPH LOMAS.

By the death of Mr. Joseph Lomas in a railway accident at El Uchain, in Algeria, on December 17th, 1908, geology has



*Yours sincerely*  
*J. Lomas*

lost one of its most energetic workers, and one of the most brilliant amongst the younger of its votaries.

Mr. Lomas commenced his scientific career as a student at the Normal School of Science, and on his attainment to the Associateship of that Institution, removed to Liverpool, where he was appointed to the post of Lecturer in Science by the Liverpool School Board.

Though primarily a geologist, Lomas by no means confined his attention to the study of the rocks. His early training under Huxley had given him a love for zoology, and in Liverpool, under the stimulating influence of Professor Herdman, to which Liverpool owes so much, he did good work on the Marine Polyzoa of the district.

It was during one of the dredging excursions, organised by Professor Herdman, for the investigation of the Fauna and Flora of Liverpool Bay, that the writer first became intimately acquainted with Mr. Lomas, and it was Lomas's influence that induced him to take up science as a profession.

About the time that he was engaged on the study of the polyzoa, he was also doing valuable work on the glacial deposits of the Liverpool district, at a time when the phenomena of the Pleistocene period were the subject of much discussion, and on the deposits forming on the floor of the Irish Sea, the investigation of the latter being the special duty allotted to him during the expeditions of the Liverpool Marine Biology Committee.

Soon after his arrival in Liverpool, Lomas joined the ranks of the Liverpool Geological Society. He rapidly gained the confidence of the older members, and in 1887 was elected a member of the Council, and filled the presidential chair from 1896 to 1898.

At the end of the present year the Society will celebrate the fiftieth year of its existence, and Lomas had been unanimously chosen as the member best fitted to act as President on that occasion.

For many years the investigation of the Triassic rocks, on which the City of Liverpool stands, has occupied the members of the Society, and in this work Lomas has of late taken an active part. It was largely due to him that the Committee of the British Association for the 'Investigation of the Fauna and Flora of the Trias of the British Isles' was formed, and at the time of his death he was on his way to investigate the desert phenomena in the neighbourhood of the Biskra Oasis, under a grant from the Association.

For a number of years he acted as one of the Secretaries of the Geological Section of the Association, and as Recorder since the year 1907.

Mr. Lomas was a Fellow of the Geological Society, and in 1897 was awarded the Lyell Fund; a member of the Geologists' Association, and of the Yorkshire Geological Society.

By his untimely death, not only has Geology lost an energetic and brilliant worker, but many will feel with the writer, that they have lost a friend whose cheerful good nature and unfailing courtesy rendered him dear to all who had the privilege of his acquaintance.

ARTHUR R. DWERRYHOUSE.

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## FIELD NOTES.

### MOLLUSCA.

**Shells in British Barrows.**—Referring to my notes in 'The Naturalist' for December, Mr. A. S. Kennard, F.G.S., has written to me expressing surprise that *Helicella cantiana* is found among the other shells from Birdsall Brow. He says:— 'We have always looked upon it as a modern (*i.e.*, Roman or post Roman) introduction. I fancy that it must be an accidental occurrence. It is certainly always absent from pre-Roman beds.' The presence of this later species in a neighbouring barrow (67 Birdsall Brow) to that (65 Birdsall Brow), in which *Caecilianella acicula* is found, further confirms the view that these shells may have got into the barrows in other ways, at a later date than the interment, and that they may not be contemporaneous with the human remains. I do not wish to press this unduly, but think due weight should be given to their presence in coming to a definite conclusion on the point of the age of the shells in the barrows.—E. P. BLACKBURN, Gloucester.

**Mollusca at Clapham.**—The Conchological Section of the Yorkshire Naturalists' Union at Clapham in September, was represented by the undersigned, Attention was paid to a portion of the district not hitherto investigated, that lying eastwards of Clapham and about Austwick. Twenty-one species were noted, as follows:—



*Arion ater*  
*A. subfuscus*  
*A. circumscriptus*  
*A. hortensis*  
*A. intermedius*  
*Agriolimax agrestis*  
*Hyatinia cellaria*  
*H. alliaria*  
*H. helvetica*  
*H. crystallina*  
*H. pura*  
*Pyramidula rupestris*

*P. rotundata*  
*Hygromia granulata*  
*H. hispida*  
*H. rufescens*  
*Vallonia pulchella*  
*Helicigona arbustorum*  
*Cochlicopa lubrica*  
*Pupa cylindracea*  
*Clausilia bidentata*  
*C. cravenensis.*

making altogether six species of slugs, and sixteen of land-shells; no fluviatile species were noted. The *Clausilia cravenensis* were brought by the geologists from the higher land, and Mr. R. Fowler Jones was the finder of *Arion ater* and *A. subfuscus*. Of *Agriolimax agrestis*, in addition to the type and var. *reticulata*, which abounded, one example was found of var. *lilacina*.—W. DENISON ROEBUCK, Leeds.

## SOME NEW BOOKS.

### GEOLOGY.

**Stanford's Geological Atlas of Great Britain and Ireland** (with plates of characteristic fossils) by **Horace B. Woodward, F.R.S., F.G.S.** Second edition. 190 pp. and 50 coloured geological maps and plates of fossils. 12/6 net.

In this compact little volume Mr. H. B. Woodward has succeeded in compressing an excellent summary of the geology of the British Isles. There is an admirable introduction referring to the general geological structure of the Islands, an account of the igneous, sedimentary and metamorphic rocks, a chapter on the mineral products, detailed descriptions of the geology of the various counties, descriptions of the features observable along the principal lines of railway, and an account of the geological structure of Ireland. There are also the clearly-coloured maps (with key), and tables of characteristic fossils.

In the present edition Mr. Woodward has included much relating to Ireland; the maps have been brought up to date; and in other ways the work has been made as useful as possible for its size. Mr. Woodward's name on the cover is quite a sufficient guarantee for the general accuracy and excellence of the publication. The amateur geologist will be particularly pleased with the clearness of the maps, and also with the fact that the principal collecting grounds are indicated.

**Genesis of Metallic Ores and of the Rocks which enclose them,** by **Brenton Symons.** London; 'The Mining Journal.' 1908. xxxiii. + 494 pp.

In this work the author has been instigated by the desire to afford to young students a popularly written book, as devoid of technical expressions as the nature of the subject will permit. The author by no means confines himself to his favourite Cornwall, nor to the British Isles, but draws illustrations and examples from every district of the globe. The use of the word "geologic" amongst others, indicates the influence of America and American authors upon him. He also has his portrait as frontispiece, which is also usually a bad sign, no matter how good looking the author may be. The volume is divided into three 'books':—(1) Sedimentation of Rocks and Ores; (2) Metamorphism of Strata; and (3) Segregation of Metallic

Ores in Veins. These are further sub-divided into chapters, and each subject seems to be very exhaustively and thoroughly dealt with. There are also 154 illustrations (without the portrait), which help to make his points clearer. A perusal of the book leaves one with the impression that what Mr. Symons does not know about ores and veins and lodes and vadose solutions, and the 'oneness' of rocks is not worth knowing. The book would have been much improved in appearance if some less funereal type had been used for numbering of the pages, and if a much greater margin had been allowed. But then perhaps the author would not have been able to say:—

'Go little book, from this my solitude!

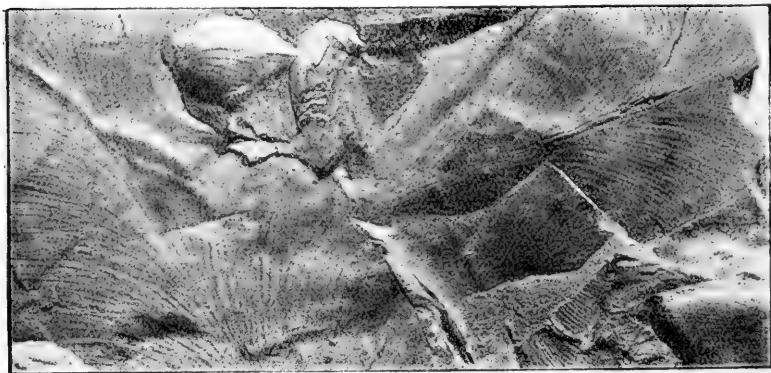
I cast thee on the waters—go thy ways;

And if, as I believe, thy vein is good,

The world will find thee after many days.'

**The Geology of Coal and Coal-Mining**, by **Walcot Gibson, D.Sc., F.G.S.** London: Edward Arnold. 341 pp., 7/6 net.

This volume is the first of a series of works on economic geology by experienced geologists; and if the rest in any way approaches the present one in the excellence of its matter, the clearness of its style, and the wealth of its illustrations, it will indeed be a magnificent series. Dr. Gibson's extensive experience in the British and South African Coalfields enables him to speak first-hand on the various questions discussed; consequently the volume has a much greater proportion of original matter than would otherwise have been the case. After an introductory chapter, the author deals in detail with the varieties of coal, the chemical and physical characters; coal as a rock, its formation and origin, distribution; fossils as zonal indices, studies of exposed and concealed coalfields, etc. He then



*Glossopteris browniana* Brongt. (Reduced).

deals with the principal coalfields of Britain, and next refers at some length to the coalfields of various parts of the world. Perhaps one of the most important, as well as the most interesting parts of the book is that dealing with the value of fossils as zonal indices. Too much stress cannot possibly be attached to this side of the subject. Dr. Gibson's field-work enables him to speak with more than usual emphasis as to the value of zonal fossils, and his remarks on this subject should be read, marked, learned, and inwardly digested by every geologist, mining engineer, as well as by the increasingly large number of monied gentry who have an interest in coal which is other than scientific. This chapter is profusely illustrated by photographs, etc., of typical fossils. There is also a very good index. The publishers kindly enable us to reproduce one of the illustrations herewith.

**An Introduction to Geology**, by **W. B. Scott, Ph.D., LL.D.** New York: The MacMillan Company. 816 pp., 2nd edition, 22/- net.

This excellent volume is intended to serve the same purpose in America that Sir Archibald Geikie's well-known 'Class-book' does in this country, and there can be little doubt that Dr. Scott has rendered a great service to American geology in producing the book. That it is appreciated is shewn from the comparatively short time that has elapsed between the publication of the first and second editions. In the interval, the author has had the advantage of many suggestions, of a good proportion of which he has availed himself. A perusal of the pages, and of the beautiful series of illustrations, almost makes an English geologist envious of his American brothers in their wealth of geological phenomena on a grand scale. The chapters on 'The Atmosphere,' 'Running Water,' 'Snow and Ice,' 'Lakes,' etc., are particularly striking from the admirable illustrations which are given, many of which are such as could only have been taken from America. The chapters devoted to the later geological deposits and their extraordinary contents are illustrated in a style that would make an English writer hesitate. The volume has been prepared in an unusually substantial and careful manner, and will doubtless long be the book of its kind across the water. To English geologists it will prove of great worth for purposes of comparison.

**Scientific Confirmations of Old Testament History**, by **G. Frederick Wright, D.D., LL.D., etc.** Bibliotheca Sacra Co., Oberlin, Ohio, U.S.A. 422 pp., \$2 net.

Prof. Wright's reputation as the leader of the school of glacialists in America; his brilliant books on 'The Ice Age in North America,' 'Man and the Glacial Period,' 'Greenland Ice Fields,' etc.; and his gift as a lecturer—a gift appreciated by many English geologists who have heard him—demand that any production from his pen should receive the careful consideration of the scientific world. In the present book, which has now been published some little time, Prof. Wright hopes to do 'something to re-establish confidence in the historical statements of the Old Testament, and, at the same time, of so unfolding the marvellous geological events of the post-Tertiary period, as to incite the general reader to a closer study of its significant and overwhelming facts, which invite investigation on every hand.'

Prof. Wright has visited the districts he describes, and whilst much of the matter dealt with in the volume does not come within the scope of this journal, we cannot but admire the ingenious way in which many of the extraordinary occurrences recorded in the Bible are here explained. The geologist will find much in the volume to interest him—particularly that part relating to the author's investigation of the loess of Northern China, a deposit which he carefully examined and here describes in detail. With regard to the 'Evidences of a Deluge in Europe,' we notice that Prof. Wright is a disciple of the late Prof. Prestwich. He accepts Prestwich's view of the origin of the rubble drift, and shelters himself behind Prestwich's great reputation; though at the same time he has been over much of the ground described by that author. There can, of course, be no question of the great floods covering the northern hemisphere at the close of the glacial period, and there is also evidence of a great destruction of animal species, whose remains are found with palæolithic man. Consequently the arguments brought forward by Prof. Wright should receive every consideration in dealing with this matter. In perusing this book, we naturally were anxious to see how far the well-known works of Sir Henry H. Howorth had influenced our author. Oddly enough, we can only find one reference to that writer, as follows:—'No doubt the greater part of the arguments for the Flood, drawn from the loess by Sir Henry Howorth and others, are explained by fuller knowledge of the irregularities produced by the slowly-melting ice-sheet.' We don't quite know whether Sir Henry would be altogether pleased with this interpretation of his three big books!

## NORTHERN NEWS.

A 'fossilised mushroom' has been presented to the Beverley Museum.

We notice the Editor of a paper complains that for several days he could not put his hat on without pain!

We notice a recent writer on Yorkshire ornithology states that the Stone Curlew 'ran on all *fours*,' with its large relative, the Great Bustard.

The Yorkshire Wild Birds' and Eggs' Protection Committee begs to acknowledge the receipt of two guineas from the Royal Society for the Protection of Birds.

A list of Lincolnshire heronries appears in 'The Zoologist' for December. In the same journal is figured a nest of the Short-eared Owl, with eight eggs; 'the first ever recorded for Notts.'

Mr. W. E. Clarke contributes some notes on the Occurrence of Eversmann's Warbler at Fair Isle; an addition to the British Fauna, to the 'Annals of Scottish Natural History' for January.

The fine collection of Anglo-Saxon jewellery formed by the late Sir John Evans, and bequeathed to his son, has been presented by Dr. A. J. Evans to the Ashmolean Museum at Oxford.

A second edition of the well-known 'Borough' Guide to Hull has been called for (A. Brown & Sons, 2d.). It is prepared by Mr. T. Sheppard, and contains many improvements upon the previous edition of two years ago.

In describing the furs exposed for sale in a well-known emporium, the 'Western Mail' says:—'a really interesting study in natural history is afforded by the tigers, leopards, zebras, and monkeys, not to mention smaller animals, such as the *minx*.'

We regret to announce the decease of William Salkeld, on the 29th October, at Christchurch, N.Z., at the ripe age of seventy-six. He was a native of Cumberland, as his name would seem to indicate; taxidermist by trade, and a skilled and experienced ornithologist.

Nature Study is evidently making headway, judging from the following answers selected from some boys' recent examination papers:—'Africa is a very dark place, nearly covered with trees and animals'; 'To kill a butterfly you pinch its borax'; 'The bloodvessels are the veins, arteries, and artilleries'; 'A ruminating animal is one that chews its cubs'; 'The masculine of vixen is vicar.'

The December 'Entomologists' Record' has one note that can be appreciated by a non-entomologist. An old gentleman, observing a boy's very crude attempts at catching moths, advised him to go to the library and take out an elementary book on entomology, which would enable him to be more successful. A little while after, on seeing the same boy still persuing his old methods, he enquired why he had not read a book on the subject. 'I did,' was the unexpected reply; 'but it did not help me at all. The book he had read proved to be 'Advice to young moth-ers!'

Mr. W. E. L. Wattam sends the following Errata in the Index of 'The Naturalist' for 1908. The Fungi records *Coprinus cordisporus* Gibbs., n. sp., and *Humaria globosa-pulvinata*, n. sp., C. Crossland, indexed under 'Species and Varieties New to Britain,' should have appeared under 'Species and Varieties New to Science.' All the records of Arachnida, Flowering Plants, Fungi, and Mosses and Hepatics indexed under 'Species and Varieties New to Science,' should have appeared under 'Species and Varieties New to Britain.' All these records are, however, properly indexed under their respective County sub-headings. 'The record *Enicmus fungicola* near the end of "Fungi, Yorks," should come under "Coleoptera, Yorks."'

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# THE NATURALIST.

**A MONTHLY ILLUSTRATED JOURNAL OF  
NATURAL HISTORY FOR THE NORTH OF ENGLAND.**

EDITED BY

**T. SHEPPARD, F.G.S., F.S.A.Scot.,**

THE MUSEUM, HULL;

AND

**T. W. WOODHEAD, Ph.D., F.L.S.,**

TECHNICAL COLLEGE, HUDDERSFIELD.

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All communications should be addressed to the Hon. Secretary,

T. SHEPPARD, F.G.S., The Museum, Hull.





Poisonous Fungus (*Amanita phalloides* Fr.).



## NOTES AND COMMENTS.

### LARGE LARCH SAW-FLY IN THE LAKE DISTRICT.

In the December 'Journal of the Board of Agriculture,' Mr. C. Gordon Hewitt, of the University of Manchester, contributes a paper on the ravages of the large Larch Saw-Fly (*Nematus erichsonii*) in the Lake District. The life-history of the insect is dealt with, and the way in which it damages and eventually kills the larches is pointed out, and methods of prevention are given. A map of the Lake District accompanies the report, which indicates where the Saw-Fly is present, where the trees are rather badly attacked, and where the trees are very badly attacked, the last being in the vicinity of Bassenthwaite Lake, Buttermere and Thirlmere.

### A POISONOUS FUNGUS.

In the November issue of the same Journal is an admirable illustration of *Amanita phalloides* Fr., one of the most dangerous of our poisonous fungi. This, by the kindness of the Controller of His Majesty's Stationery Department, and of the Secretary of the Board of Agriculture, we are kindly permitted to reproduce for the benefit of our readers (Plate I.). Many cases of poisoning by this fungus are on record, and in not a few instances the results have proved fatal. The species usually occurs in woods, and for this reason is not likely to be confounded with the common mushroom. The colour of the pileus varies from greenish to nearly white, according to the shade. 'The presence of a ring and a volva, together with the persistently white gills and pale yellow or greenish pileus are the more striking features of this fungus, and are sufficient to brand any specimen possessing them with the strongest suspicion.' With this form, at any rate, we do not recommend a certain Yorkshire mycologist's method of 'first trying 'em on the missus!'

### THE FOOD OF BIRDS.

The Board of Agriculture has recently issued an important Supplement to its Journal, which we should recommend our readers to obtain. It is entitled 'The Food of some British Birds,' and is a record of the twenty years' observations on the contents of the crops of various birds, by Mr. Robert Newstead, of Liverpool. The work consists of nearly one hundred pages, and can be obtained for 4d., post free, from the Board of Agriculture, 4 Whitehall Place, S.W. In view of the allegations

made against the birds by horticulturalists and others, this record of *facts* should be carefully perused. As the report points out, there are, on this subject, two points requiring special investigation. 'It is necessary to examine and tabulate the contents of the crops of certain birds in each month of the year, so that an opinion may be formed of the benefits or injuries caused by birds at all seasons. Secondly, it is necessary that some estimate should be made of the available food in the district where the birds were feeding when killed, in order that it may be decided whether the food discovered in the crops were selected from choice or from necessity.'

#### A THOUSAND CHESTER RECORDS.

In his introductory remarks, Mr. Newstead points out that the records of the materials upon which the memoir has been largely built are based upon 871 post-mortem examinations of the stomach contents, and the 'pellets' or 'castings' of 128 species of British birds. In the case of the Starling and a few other birds, these have been supplemented by a number of definite observations made in the field, bringing the total to considerably over 1100 records. From an entomological standpoint these are probably the most extensive yet compiled in this country, and as such, form a valuable contribution to our knowledge of the food of British birds, especially in relation to agriculture and horticulture. The majority of the material examined was collected in Cheshire, and as the conditions there are probably similar to those obtaining in other areas, it can be safely said that the records demonstrate the important part played by the majority of our British birds in checking the increase and lessening the ravages of garden and field pests.

#### NEW BOTANICAL FINDS.

Probably as an indirect result of the trio of new British plant lists, which were noticed at some length in our last volume, botanists in the north and centre of England appear to have had a 'fillip.' Not only has *Selinum carvifolia* been turned up in Nottinghamshire, but a new British Broomrape (*Orobanche procera* Koch,) in West Yorks., and the larger chestnut-brown seeded Water-Blinks (with free flowers) in Merionethshire and elsewhere; and Mr. Clement Reid led to this by detecting *both* sorts of seeds, shining and dull black, in the lacustrine leaf-bed deposits!

## NEW SPIDERS.

The Rev. O. Pickard-Cambridge, M.A., F.R.S., has favoured us with a copy of his paper on 'New and Rare British Arachnida, noted and observed in 1907,' reprinted from 'The Proceedings of the Dorset Natural History and Antiquarian Field Club,' p. 161, 1908. This forms a valuable summary of the work accomplished among the Arachnida in Great Britain during 1907, and is illustrated by one plate. The species noted for the North of England are as follows:—*Ischnothyreus velox* Jackson (new to science), found in hot-houses at Alnwick, Northumberland, and at Chester; *Prosthesima lutetiana* L. Koch, from Port Erin, Isle of Man; *Hahnina pusilla* L. Koch, and *Theridion impressum*, L. Koch, from Delamere Forest, Cheshire; *Euryopsis flavomaculata* C. L. Koch, from Newton Moss, Penrith; *Robertus neglectus* Camb., from the Hull District; *Leptyphantes angulata* Camb., from Northumberland; *Hilaira pervicax* J. E. Hull, from Whitfield, Northumberland; *Centromerus concinnus* Thorell, from Hull; *C. probabilis* sp. n. and *C. firmus* Camb., from Northumberland; *Maro minutus* Camb., from near Huddersfield; *Maro falconerii* from Delamere Forest, Cheshire; *Erigone spinosa* Camb., a species new to Britain, found on Saltend Common, near Hull (for a description of this species see the 'Naturalist,' 1908, p. 378-9); *E. longipalpis* Sund., from Kirkby, Lancashire, and the Humber Shore, near Hull; *E. arctica* from Cheshire; *Entelecara jacksonii* Camb., from Delamere; *Araeonus crassiceps* Westr., from Newton Moss, Penrith; *Panamomops bicuspis* from Hull. This report also contains some interesting information concerning species introduced into greenhouses, etc., with foreign plants.

## DERBYSHIRE GLACIERS.

Under the suggestive title 'Observations of the Effects of Glaciers in Derwent Valley, Derbyshire,' by E. M. Wrench, M.V.O., F.R.C.S., we were recently tempted to peruse a paper in the Journal of the Manchester Geographical Society. In it we found much about the relationship between geology and geography, Classics in Education, Roman Roads, Fog, Kelts and Norsemen, but very little about ancient Derbyshire glaciers. Mr. Wrench, however, has found 'scoriated rocks,' which had been 'overlooked by Sir Archibald Geikie because his experience was confined to the effects of glacial action upon hard

rocks, the granites of Scotland, and the slates of Wales.' It is apparent that Sir Archibald should take a few lessons in field geology, under the guidance of Mr. E. M. Wrench, M.V.O., F.R.C.S.

#### A GEOGRAPHICAL OBSERVATION.

Mr. Wrench has made yet another observation. He has traced the size and extent of the 'Derwent Glacier'; and located its marks. 'The flow of such a glacier in a valley of such easy gradient, would not be more than a few inches per day, or two hundred yards in a year, and if so, its progress would occupy several centuries, and confirm Lord Avebury's calculation of the duration of the Glacial Period *lasting one hundred and fifty thousand years!*' Doubtless Lord Avebury will be duly grateful for this striking confirmation of his theory.

#### GLACIERS AND PLACE-NAMES.

Mr. Wrench writes 'Lastly [thank heaven!] many place names are derived from the glacial features of the soil, such as *Tozenhurst*=Raggedwood, mentioned in Geological Survey as possibly glacial moraine; *Wormster*=Wormstall=Dragon's den.. The River *Derwent*, clear water, from the clean *sweep* of the shale from the valley.' Quite so; and just in the same way the name *Wrench* must be of glacial origin, as it belongs to an 'M.V.O., F.R.C.S.'

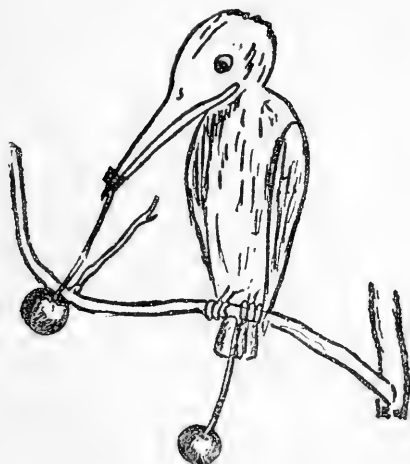
#### THE NATIONAL TRUST.

We have recently received the thirteenth Annual Report of the National Trust for Places of Historic Interest or Natural Beauty, and it is very pleasant reading. The land upon which the 'Grey Wethers' occur, near Marlborough, already referred to in these columns, has been secured to the nation for all time; Ludshott Common (542 acres) and the adjoining woodland (17½ acres) can be secured for £1800, and of this all but £150 has been subscribed. Other tracts of land are announced as gifts to the Trust, and are now preserved to the public for ever. In many instances these 'breathing-spaces' have been snatched from the hands of the speculative builder. The Report also contains a lengthy list of lands, historic buildings and monuments under its charge, from which it is apparent that its excellent work will be much more appreciated in the future by the public than it is to-day. The Secretary, Mr. Nigel Bond, of 25 Victoria Street, Westminster, S.W., will

be glad to send copies of the Report to anyone interested, and to few better purposes can spare cash be placed than in supporting the Trust's efforts to keep our country as we now know and love it.

#### HOW TO TELL THE BIRDS FROM THE FLOWERS.

We have received two extraordinary publications, written by R. Williams Wood, one of which bears the above title. They shew to what an extent Nature Study has progressed in America ! At the top of each page is an illustration, and below this the description in verse. In order that our readers may see the nature of these, we reproduce one or two of them.



THE CROW.



THE CROCUS.

Some are unable, as you know,  
To tell the Crocus from the Crow ;  
The reason why is just because  
They are not versed in Nature's laws.  
The noisy cawing Crows all come,  
Obedient to the Cro'custom,  
A large Crow caw-cus to convoke,  
You *never* hear the Crocus croak !

## ANIMAL ANALOGUES\*

is the title of the second little volume, and this starts off with—



THE BEE.



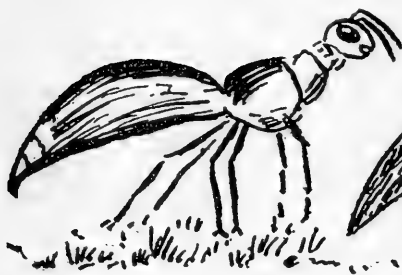
THE BEET.



THE BEETLE.

Good Mr. Darwin once contended  
That Beetles were from Bees descended ;  
And as my pictures show, I think,  
The Beet must be the missing link.  
The Sugar-Beet and Honey Bee  
Supply the Beetle's pedigree :  
The family is now complete—  
The Bee, the Beetle, and the Beet.

## ANTS AND PHEASANTS.



THE ANT.



THE PHEAS-ANT.

The Ant is known by his ant-ennae,  
Whereas the Phea-sant hasn't any,  
And that is why he wears instead  
A small red cap upon his head ;  
Without his Fez, indeed the Pheasant  
Would be quite bald, and quite unpleasant.

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\* Paul Elder & Co., San Francisco. 28 pp., 50 c. net.

## NOTES ON BATS.

(PLATES II. and III.).

ARTHUR WHITAKER,  
Worsborough Bridge.

THE phenomenally cold weather during April and early May of last year caused bats to remain in the torpid condition usual during hibernation for a longer period than they generally do, and May 27th was the first date on which I noticed these creatures flying in any numbers. The evening of that day was particularly warm and still, and in taking a walk round Rockley Dam, a sheet of water about a quarter-of-a-mile long, surrounded by woods, I found that many bats were on the wing. I netted several, all proving to be the common Pipistrelle (*P. pipistrellus*). One of these, a female, I kept alive, putting it in a small cage by itself. On the 10th of July it gave birth to a single young one, at 3-30 to 4 p.m., clinging head downwards to the cage side at the time, and receiving the young one in its right wing, which was held partially extended for the purpose. Unfortunately, the young bat did not live many days. All my observations in connection with it agree with those previously published,\* but the period of gestation is now shown to be not less than 44 days.

On the 15th of July 1908, a box of bats from Wells was forwarded to me by rail. They had been caught two days previously, and I found the box contained one Lesser Horseshoe (*R. hipposiderus*) and four Greater Horseshoes (*R. ferrum-equinum*). One of the larger species was a female, and had given birth to a young male in transit. The latter was lying on the bottom of the box in a dying condition, but though this was evidently the case, it showed great tenacity to life, clinging to its mother very firmly when I put them together in a small cage. When she became restless and detached and left it, the young bat, though but a day old, hung by one foot from the top of the cage for over fifteen minutes, a favourite resting position for adult bats of this species (See Plate II., fig. 1), but surely an extremely exhausting one for a newly-born individual. The Lesser Horseshoe Bat died a few hours after it came into my possession. It was a female, and contained a fully developed embryo ready for extrusion,

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\* 'Naturalist,' 1907, pp. 75, 76, etc.

One interesting fact relating to the young Horseshoe Bats is, that at birth, instead of being practically naked as are the young of the *Vespertilionidæ*, they are clothed with a very short, and soft, silky down, especially noticeable on the back, shoulders, and top of the head. Not only was this most conspicuous in the case of the newly-born Greater Horseshoe, but it was even plainly apparent in the embryo of the lesser species.

The call of the young Greater Horseshoe Bat was fairly loud, and consisted of several chirrups, repeated in quick succession, at intervals.

I kept two or three of the adult Greater Horseshoe Bats alive for some time, and most interesting pets I found them. Hanging head downwards, often by one leg only, they slept most of the time, suspended from a bar fixed across the top of their cage (a large meat safe). Sometimes they hung separately, but more often they slept all hanging together in a cluster. When this was done, a perfectly regular and almost exactly geometrical group was frequently formed.

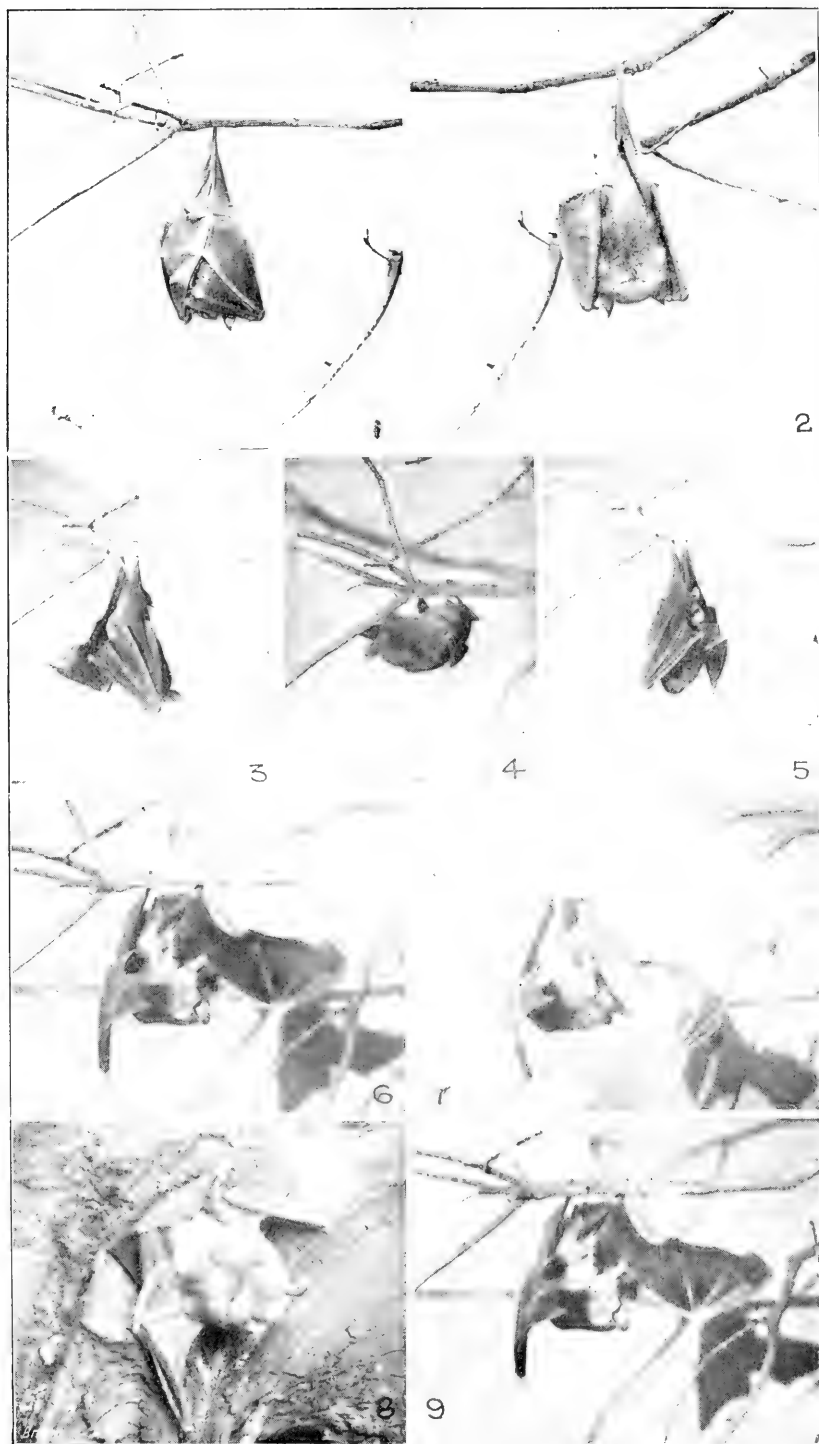
Each of the trio held the perch with one leg only and hung facing inwards, so that the three faces were almost touching. Each had the left wing folded over its own breast, and beneath this tucked its disengaged leg, whilst with the right wing almost fully extended for the purpose, it did its share towards enclosing the whole group, which was by this means effectually screened and shielded from draughts, by the covering of three overlapping and encircling wings.

When living moths were put into their cage, the bats would catch them, but only seemed able to do so when the insects were in motion. An insect which kept quite still seemed perfectly safe; whilst on the other hand, the more rapid its movement, the more infallibly did one or other of the bats secure it by a sudden dart from its perch, seizing the insect in its mouth, and returning to the perch to eat it. Moths which were actually flying were caught much more easily than those which fluttered on the cage floor or sides.

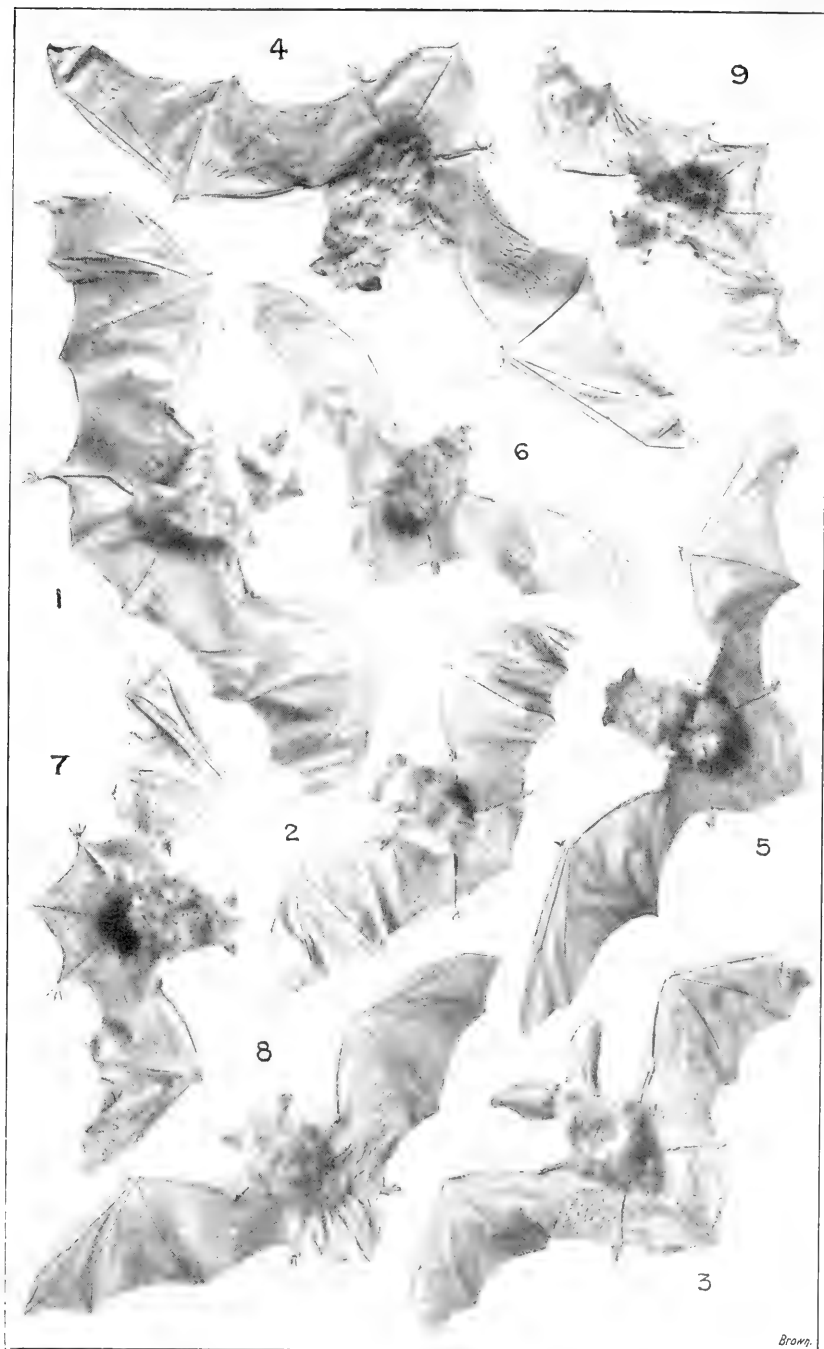
These bats took to feeding on meal-worms readily, and like all other bats I have kept, no sooner tasted them than they developed so great a liking for them that I could only get them to take any more natural food with difficulty. They ate on an average five dozen meal-worms each per day, and would take these from my fingers, or forceps, as they hung from their







Greater Horse-shoe Bat (*R. ferrum-equinum*).



Brown.

## British Bats.

1. Greater Horseshoe; 2. Lesser Horseshoe; 3. Long-eared; 4. Noctule; 5. Hairy-Armed Bat; 6. Pipistrell; 7. Daubenton's; 8. Natterer's; 9. Whiskered Bat. ( $\frac{1}{3}$  life size).



perch, consuming them so rapidly that I had the greatest difficulty in keeping all three bats supplied when all were dining at the same time.

During the first few days of their captivity they always pressed any insect given them against the skin of the wing, (*i.e.*, the inter-brachial membrane) until they had secured a good grip of it. Later, when they had become more accustomed to meal-worms, they almost abandoned the practice, no doubt realising that it was unnecessary. Moths given to them were invariably so treated. This habit is excellently described in an interesting article on "The Greater Horseshoe Bat in Captivity," \* written by that most accurate observer of bats, Mr. T. A. Coward. It is well illustrated on Plate II., Figs. 6, 7 and 9.

On July 27th the two Greater Horseshoe Bats then in my keeping had a most terrific fight sometime during the night, for in the morning I found one dead, the wings being torn and lacerated in several places, and the face and nostrils covered with blood. The other bat had only bled slightly at the nostrils and was little the worse. I had not previously seen the slightest sign of ill-feeling between them.

The surviving bat escaped from its cage at dusk on July 28th, and although I saw it flying about the garden for some little time, I did not manage to re-capture it.

One evening, about a week later, my friend Mr. Armitage felt confident he saw a bat of this species flying at dusk at a considerable altitude over the field adjoining our garden. This supposition was confirmed in a rather remarkable manner, for on the 4th of September, more than five weeks after my pet had escaped, Mr. Armitage and I again saw it, when together. We were returning from a ramble, and at 9-15 p.m., more than an hour after dusk, we were surprised to see it busily engaged in catching moths, as they flew about some thistle flowers growing on the railway bank at Worsborough Bridge, and directly in the path of light which fell from the back window of the signal box at the level crossing.

We saw the bat several times between 9-15 and 10 o'clock, as it flew by, or hovered about in the light from the window. Its large size, pale colour, and delicate, fluttering flight, rendered it quite unmistakable, and though I again failed to

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\* Vol. 52, Part II., Manchester Lit. and Phil. Society Memoirs.

re-capture it, it allowed us to approach within a couple of yards several times. Once or twice it appeared to almost settle on the ground. I was very much interested, and pleased to again see my lost pet, more than five weeks after its escape, yet within fifty yards of the place where I had kept it.

Records of the occurrence of the Hairy-armed Bat (*P. leisleri*) in Yorkshire are few,\* and any new ones are consequently of interest. I have recently had the pleasure of examining six preserved specimens, three of which were in the possession of Mr. G. Parkin of Wakefield, and the others in that of Mr. W. G. Chambers of Stanley. All were taken at the same time, *i.e.* towards the end of September 1902, at Oulton near Rothwell, where they were found in the roof of a cottage along with 'about forty others,' all 'apparently of the same species.' I was interested to find that of the six preserved specimens I examined, three were apparently males and three females. Probably all the bats in this large colony were Hairy-armed Bats; the six I examined were all undoubted examples of this species.

Every note I have been able to make with regard to this species and the nearly allied but far more abundant Noctule (*P. noctula*) confirms the opinion that the following peculiarity is habitual to them. Both species seem to gather in large colonies for hibernation, and these colonies are most often found occupying the roofs of buildings. They seem to comprise individuals of each sex in about equal numbers. In spring they split up into much smaller colonies, and usually take up arboreal quarters. These summer colonies will almost invariably be found to consist chiefly, if not entirely, of bats of one sex. Referring to my diary for confirmation of this, I find that every note I have made on these species, without a single exception, goes to support the statement. Take, for instance, the following :—

- 14/7/08.—Hole in beech tree, Rockley, Colony Noctules 10 M., 1 F.
- 5/9/06.—Hole in beech tree, Stainbrough, Colony Noctules, 7 F., 1 M.
- 22/8/06.—Hole in oak tree, near Barnsley, Colony Hairy-armed, 7 F.
- 20/7/06.—Hole in beech tree, Rockley, Colony Noctules, 8 M.
- 29/6/07.—Hole in beech, Rockley, Colony Noctules, 22 M., 2 F.
- 13/5/04.—Hole in beech, Stainbrough, Hairy-armed Bats, 2 M.

These are only some of many notes, all indicative of the same habits. To multiply instances is unnecessary and would only occupy too much space.

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\* See my notes on this species in 'Naturalist,' 1907, pp. 384, 385, etc.

In support of my opinion that the winter colonies are usually larger in buildings, and of both sexes, I may say that all the usual arboreal quarters I know, which are made use of in summer, are deserted during the winter months, and that a colony apparently always occupies a certain church tower at Worsborough Dale in winter, for great numbers of *Noctules* may be seen flying in its immediate vicinity in early spring and late autumn, but not in summer.

The colony of Hairy-armed Bats found at Oulton in a cottage roof in late autumn of 1902, and the large colony of *Noctules* occupying a house roof at King's Lynn, Norfolk, for many successive winters and springs, as recorded in a note by Mr. H. B. Booth,\* consisted of individuals of both sexes 'in about equal proportions.'

There is scope for much interesting speculation as to the peculiarly erratic manner in which gregarious instincts are displayed in our British bats. One cannot see that it is at all necessary for their mutual protection, for they seem to have hardly any enemies. Apparently it is not for warmth. On cold, damp days, I have several times found *Noctules* occupying lonely quarters, whilst on September 1st, 1906, one of the hottest days I ever remember, Mr. Armitage and I examined a colony of eleven *Noctules* in the hole of a tree in Stainbrough Park, and found them packed in a solid cluster in one corner of their den, actually wet with perspiration. The thermometer at the time stood at 94° in the shade and 110° in the sun.

I have found the Long-eared Bat (*Plecotus auritus*) scores of times, both in summer and winter, resting singly in cold, damp chinks of tunnels and stonework, yet if the same species be searched for in August, usually the hottest month of the year, small colonies of six to ten, or more, will be almost invariably found squeezed together in one hole. August and early September seem to be the only time when bats of this species are gregarious.

Of Natterer's Bat (*M. nattereri*),<sup>†</sup> Daubenton's Bat (*M. daubentoni*), and the Whiskered Bat (*M. mystacinus*), I have always found odd specimens, even in mid-winter, though large colonies of each of these species have been recorded. The same thing applies to the Pipistrelle. I have found odd ones even in winter, and on the other hand, I have found colonies consisting of not merely scores, but hundreds of individuals.

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\* 'Zoologist' 1905, p. 427.

The explanation of these spasmodic and periodic instincts towards gregariousness may be arrived at by the collection of a large number of exact observations; even then it may have to remain a mystery.

One difficulty in solving such problems seems to me to be so often overlooked, that I cannot refrain from mentioning it. Any characteristic, whether of structure or habit, in any creature, acquired for a particular purpose by means of natural selection, is not likely to be a benefit to the species as a whole. Take, for instance, any example of protective colouration: to whatever degree of perfection it may be developed, such development would cease the instant that it became perfectly protective. This implies that up to the very last and most minute phase of the acquirement, the enemy develops equally in cunning and perception. Reversion always has a tendency to take place in a plastic organism, and a moment's reflection only is necessary to show that no creature can exhibit protective colouration, except to the exact degree which its enemies are capable of seeing through. The degree in which it possesses protective colouration is the measure of the enemies' keenness of observation, and can only be in proportion thereto. The two things are two forces acting upon one another, and must be in equilibrium. A realisation of this fact is necessary to properly appreciate the difficulty of solving many problems in natural history, because it shows how a habit or characteristic may be acquired for a specific purpose, and yet we may not be able to see that it is fulfilling that purpose in any way. What we do see is only the present position of two or more creatures, each striving to gain an advantage over the other in the struggle for life. The temporary advantage gained by either will not be beneficial to the species as a species, but only to those individuals who possess it more than the average of their contemporaries.

On Plate III. are reproduced photographs of nine species of bats found in this country, taken from some of my preserved specimens, by Mr. Walter Wilson, for reproduction here. Nos. 1 and 2 are from bats taken in Somersetshire; all the others are from Yorkshire specimens.

The Greater Horseshoe Bat shown in different positions on Plate II., was one of my pets which I lent for a time to Mr. Riley Fortune, who kindly took these photographs of it. Figs. 1 and 2 are ventral and dorsal views of the bat, sleeping.



Fig. 5 shows the bat waking up. Figs. 6, 7, and 9 show the bat after seizing a meal-worm, in the act of pressing it against the inter-brachial membrane, in order to secure a firm grip of it. Fig. 3 shows the bat eating a meal-worm. Fig. 4 lifting up the body (by bending the legs) and rubbing the lips and mouth against its perch after eating. Fig. 8 shows how the Horseshoe Bats hold the tail curved upwards over the back, instead of downwards under the body as do the *Vespertilionidæ*.

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**A History of Horncastle**, by **James Conway Walter**. Horncastle : W. K. Morton & Sons. 218 pp., price 5/-.

Our contributor, the Rev. J. Conway Walter, may fairly claim to be the historian of the Horncastle district. From time to time he has placed on record notes dealing with the history of his neighbourhood. His latest book, now before us, may be taken as his best. In eleven chapters he deals with the early history of the place, the records from the Norman Conquest; the various churches, chapels, educational institutions, etc., railways, canals, institutes, worthies, oddities, and public houses. As an appendix there are descriptions of fourteen adjoining villages. There is no doubt that most, if not all in this volume, was well worth recording, and will be perhaps more appreciated in the future than now; but personally, we should have preferred to have seen much more relating to Roman Horncastle, and Horncastle of its earlier days—a subject which we feel sure the author could have enlarged upon. For instance, we should have liked to have seen a fuller account of the Roman urns referred to in the footnote on page 7—objects which would have been well worth figuring. The Rev. Conway Walter, however, has quite pardonably enlarged upon the subjects that he can speak about from experience. He is not by any means a young man; his memory is good, and his descriptive power the same as it always has been. It is astonishing what a lot of 'worthies' Horncastle has produced, of some of whom we had never previously heard. Lord Allerton is second on the list, and a quaint sketch of his career is given.

Throughout the work the author quotes full references. There are one or two points in this volume, however, to which it is as well to call attention in view of a second edition being issued. We doubt very much whether the author has given us sufficient (or any) evidence of the site being once a British Settlement (p. 1). The 'Mammoth' tooth, so well figured on page 5, is the tooth of a modern African elephant, doubtless a relic from an old bone-mill. The Hammer-head, which 'the writer has in his possession,' is by no means 'probably Roman.' The word 'has' is apparently a misprint for 'had,' as the identical specimen is figured in this journal for April 1908,\* and is there described as British. Obviously, therefore, Mr. Walter has either over-looked the notes in 'The Naturalist,' or he does not agree with (and ignores) the opinion there expressed. In either case, 'tis a grievous fault! The small pipes found in Horncastle (p. 8), are not Roman, but are certainly XVII. century. To 'picture to ourselves the Roman sentinel . . . solacing himself with his pipe,' is allright; but we might just as well picture the Roman sentinel careering round the walls of Horncastle on a 40 h.p. landaulette. The volume is printed upon glazed paper, which makes it unnecessarily heavy. We are now sending our copy to the binders to be lettered on the back. Otherwise, when on the book-shelf, we should not know whether it was a History of Horncastle, a scrap-book, or a psalter.

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\* 'Pre-historic Remains from Lincolnshire,' p. 137.

## PAUCITY OF REDWINGS IN THE WEST RIDING.

HARRY B. BOOTH, M.B.O.U.

A YEAR ago\* I reported on the unusual numbers of Redwings that had passed through this district, particularly overhead, and especially during the night of November 4th, 1907. This season it was the very opposite, and I never remember having heard or seen so few Redwings; and my friends report similarly. The 'birds of passage,' which we usually expect to hear in numbers during the last week in October and in early November, were only heard in stray and desultory parties, notwithstanding that the weather at the time appeared to be most favourable for hearing them. Neither have we been more favoured with the Redwings which remain here during the greater part of the winter, nor the additional ones that arrive in this district on the approach of a severe frost; they have been in much smaller quantities all round.

It is rather puzzling to learn that the same species passed in larger numbers than ever in several places in Scotland last autumn.† Mr. W. Eagle Clarke tells me that he has never previously seen so many on the Fair Isle (intermediate between the Orkney and Shetland groups). In the 'Annals of Scottish Natural History (1909, p. 7), Miss E. V. Baxter, in 'Bird Notes from the Isle of May' (Firth of Forth), writes of the Redwing:— 'After I left, Mr. Maccuish (the light-keeper), reports a great "rush" on October 16th, and on the 23rd, from 2 a.m. till daylight (W. wind, light, hazy) "an enormous rush" followed, and another from 7 p.m. on the 23rd till daybreak on the 24th. On the 27th, 28th, and 29th of October, there were large flocks at the lantern; from 6 p.m. on the 3rd of November till daylight on the 4th, there were many at the light; and next night the "rush" was repeated. Mr. Maccuish says that this was the largest "rush" of one species that he has every seen.' There are also several other places in Scotland where Redwings have been noted as more numerous than usual.

I don't wish to infer that birds passing over parts of Scotland should pass over our immediate neighbourhood; but it certainly appears strange that whilst Redwings should be passing south in Scotland in such great numbers, we should

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\* 'The Naturalist,' 1908, p. 17.

† A large number passed Spurn in the month of October.—EDS.

be wondering why they are so scarce this season, both as 'birds of passage' and as winter visitors. These birds (even if unobserved), must have passed somewhere in the north of England or Ireland, and to these must be added many that usually make use of this neighbourhood during the greater part of the colder season. I have not heard of any great numbers having been reported, not even on the coasts. I would like to suggest that each reader of 'The Naturalist,' who has taken notes of the movements of Redwings during the present season, should send in a short report to the Editors. These could be tabulated, and we might obtain some sidelight on the complicated question of bird migration, and more particularly respecting a bird whose movements are perhaps more easily traced in our island, than are those of any other species.

Fieldfares are also in smaller numbers here than usual, but the difference is not so marked as in the case of the Redwings.

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## EUPHRASIAS OF NORTH-EAST YORKSHIRE.

J. G. BAKER, F.R.S.,

During my visit to North-East Yorkshire last summer, I collected several Euphrasias, which have been kindly examined for me by Messrs. Bruce, Jackson and Pugsley, and determined as follows :—

*E. borealis* Towns. Side of the road between Whitby and Scarborough, near Hayburn Wyke.

*E. stricta* Host. East Row woods, near Sandsend and an allied form, by the side of the Whitby and Scarborough road, near Hayburn Wyke.

Form between *curta* Fries and *gracilis* Fries. Side of the lower road between Castleton and Westerdale.

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Mr. F. H. Day records *Aræocerus fasciculatus* De Geer, as a British insect, in 'The Entomologist's Monthly Magazine' for December. The insect occurred in some numbers in a confectioner's shop window in Carlisle.

No. 69 of 'The Mineralogical Magazine' has recently appeared, and contains an obituary notice of Dr. H. C. Sorby, by Prof. J. W. Judd. Sorby's researches and methods undoubtedly made mineralogical science what it is to-day. Mr. A. B. Dick contributes some notes on Kaolinite, and records examples of this mineral from Anglesey, from the Hambleton Quarry, near Bolton Abbey; in the sandstone of a coalmine near Newcastle-on-Tyne; and 'in the millstone grit of a quarry at Congleton, Cheshire.'

## THE HORNET IN YORKSHIRE.

REV. W. C. HEY, M.A.

IN reference to the note appearing at the foot of my paper in the February 'Naturalist,' I quite admit that the Hornet has been taken in Yorkshire. I was aware of this as I had Mr. Roebuck's 'List of Yorkshire Hymenoptera' before me. Still I should not term the Hornet a Yorkshire Insect. In the case of creatures such as Birds and Wasps, which have a rapid and easy method of locomotion, the occurrence of a few stragglers within the county borders does not, to my thinking, give them the right to be called Yorkshire species. If I crossed the channel, and spent a few hours on the sand-dunes at Calais, I should not become a Frenchman. 'In spite of all temptations to belong to other nations,' I should remain an Englishman. Of course, the occurrence of these 'vagrom' creatures should be recorded, for they may possibly be the pioneers in an extended distribution of the *Vespæ*. When such a species breeds within the county, or becomes a regular visitor, then I should call it a Yorkshire species.

The easiest method to distinguish the Hornet from the other species, is by the colouration. *They* are all coloured yellow, with black markings, but the Hornet wears brown and orange. If people knew and remembered this, no other insect could be mistaken for the Hornet.

I find the term Hornet is also sometimes applied to another large Hymenopteron, viz., *Sirex gigas*. This mistake is natural enough when a person simply conceives of a Hornet as an aggravated form of Wasp—'just like a Wasp only more so'—as has been said.

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**Popular Natural History of the Lower Animals (Invertebrates),** by **Henry Scherren, F.Z.S.** Second Impression. 288 pp., 2/6.

In this the author rightly points out that whilst most popular natural history books deal with the larger animals, few deal with the backboneless animals. 'Field and hedgerow, park and garden, pond and strand will yield the young naturalist hosts of subjects for investigation,' and in order that the volume may be of practical service, directions are given for keeping these under observation. Mr. Scherren then deals with arthropods, insects, crustaceans, starfish, worms, sponges, etc., etc., in a very entertaining way, and the book is rendered more interesting by nearly two hundred illustrations, some of which are coloured. The volume is very cheap, and should do good by creating an interest in the more neglected branches of natural history. It is quite refreshing to find a natural history book now-a-days in which birds are not described.

# FOSSIL PLANTS FROM THE MARSKE AND UPLEATHAM QUARRIES, YORKSHIRE.

REV. GEORGE J. LANE, F.G.S.,  
AND  
MR. T. W. SAUNDERS.

A PARTY of Yorkshire geologists, as intimated in a previous issue of the 'Naturalist,' visited the Marske quarries in September 1908. On that occasion many specimens of Lower Estuarine plants were obtained, and by this time, no doubt, their genera and species will have been determined. The two quarries are rich in plant remains, and the writers were urged by the geological party above mentioned, to make further investigations. This delightful task has been prosecuted with vigour.

To readers unacquainted with these quarries, a few elucidatory notes will be helpful. Mr. Fox-Strangways, in his memoir of Jurassic strata of Yorkshire, gives the following table of Bajocian strata :—

- |                                   |                      |
|-----------------------------------|----------------------|
| 1. Upper Estuarine beds.          | 4. Millepore beds.   |
| 2. Grey or Scarborough Limestone. | 5. Lower Estuarines. |
| 3. Middle Estuarines.             | 6. Dogger.           |

Plants have been collected from each of these Estuarine beds. The Millepore bed is absent in North-East Yorkshire, making the line of demarcation between the Middle and Lower Estuarines difficult to determine. The Marske and Upleatham quarries are situated on the northern and southern faces of the Upleatham outlier of the Inferior Oolite. They are within easy access from Marske or Saltburn, and are equidistant from either station. The sandstones in the quarries are massive, lenticular, and current-bedding is conspicuous in both quarries. Superposed upon these sandstones are deposits of sandy shales, and above these there is a thin capping of glacial drift. Between the sandstones and shales there occurs a band of ironstone which, in some places, reveals a confused mass of fossil plants. This stratum of ironstone is continuous throughout the two quarries, in some parts attaining a thickness of eighteen inches, while in others, it thins out so as to be almost unrecognisable. This ironstone band is not fossiliferous throughout, large sections shewing not a vestige of a plant. The shales above the ironstone also contain plants, but these are sometimes very difficult to decipher, the venation being not so well preserved as in the ironstone.

Several years ago, the late Rev. J. Hawell did some excellent pioneer work in the Marske quarry, which resulted in the identification of seventeen species. He also found a *Dictyozamites* for the first time in England, which proved to be a new species, and was named *Dictyozamites hawelli*.

The following is a list of plants found by us since September 1908, duplicates having been given to the Hull and Middlesbrough Museums. Many of these specimens have been submitted to Prof. Seward for diagnosis. We also wish to acknowledge the valuable assistance of Mr. Elgee of the Middlesbrough Museum, who has given us access to plants previously determined, and helped us in our determinations.

I. EQUISETALES.		<i>Otozamites beani</i> L. & H.
<i>Equisetites columnaris</i> (Brongn.).	„	<i>graphicus</i> Leck.
„ <i>beani</i> (Brongn.).	„	<i>parallelus</i> Phill.
	„	<i>feistmantelli</i> Zig.
II. LYCOPODIALES.		<i>Nilsonia compta</i> Phill.
<i>Lycopodites</i> sp.	„	<i>mediana</i> Leck.
	„	<i>tenuinervis</i> Nath.
		<i>Dictyozamites hawelli</i> Sew.
III. FILICALES.		V. GINKGOALES.
<i>Teniopteris major</i> L. & H.		<i>Ginkgo digitata</i> Brongn.
„ <i>vittata</i> Brongn.		<i>Baiera gracilis</i> Bun.
<i>Sagenopteris phillipsi</i> Brongn.	„	<i>phillipsi</i> Nath.
<i>Cladophlebis denticulata</i> Brongn.	„	<i>lindleyana</i> Schemp.
„ <i>haiberensis</i> ?		<i>Czekanowskia murrayana</i> L. & H.
<i>Laccopteris polypodioides</i> ?		<i>Beania gracilis</i> ? Can.
IV. CYCADOPHYTA.		VI. CONIFERALES.
Base of flower of <i>Williamsonia</i> L. & H.		<i>Araucarites</i> sp.
Fructification of „ L. & H.		<i>Pagiophyllum williamsoni</i> Brongn.
<i>Williamsonia gigas</i> L. & H.		<i>Brachyphyllum mamillare</i> Brongn.
„ <i>pecten</i> L. & H.		<i>Cheirolepis setosus</i> ? Phill.

We have other specimens in our possession pending determination. Further finds will be reported from time to time in 'The Naturalist.' We note that *Otozamites beani* occurs in Upleatham quarry, but is very scarce in Marske; *Teniopteris vittata* is found in larger specimens in Upleatham; *Nilsonia compta* is plentiful in the central part of Marske quarry; *Dictyozamites* is extremely rare. On much the same geological horizon near Carlton, Mr. Lane found recently two new species which Prof. Seward determined as follows:

*Zamites* sp., resembles *Z. buchianus* (Wealden Flora).

*Zamites* sp., probably new.

We feel convinced that further effort will be successful.

## THE MIGRATORY MOVEMENTS OF CERTAIN SHORE- BIRDS AS OBSERVED ON THE DUBLIN COAST.

C. J. PATTEN, M.A., M.D., Sc.D.

(Continued from page 52).

### SANDERLING (*Calidris arenaria*)

I have recently obtained some information which tends to modify one's views concerning certain migratory movements of this species. Until the year 1906, I believed that it was absent from the Dublin coast from about four to six weeks, which, speaking generally, extended from the end of June to the beginning of August. In the 'Aquatic Birds,' I mention that the migratory move begins in August, or even towards the latter end of July, but though I was under the impression that the supposed adult birds, seen early in August, could hardly as yet be returning from their breeding-quarters in the far north, I had an idea, shared by the late Mr. E. Williams, that such birds only partially migrated, and had flown down from Scotland, or perhaps from the Orkneys or Shetlands, having reached this latitude, but going no further north when on the vernal migration. However, the recent observations made by Mr. A. Williams go to show that this bird, like the Turnstone, frequents the Dublin coast throughout the year. In accordance with my own observations, Mr. Williams has noticed the Sanderling remaining until well on in June, when on its vernal migration, and returning at the end of July during the Autumn move. He informs me that prior to 1906, he made no records in early or mid-July. However, in that year, much to his surprise and delight, he discovered this species on the Dublin coast on different occasions in July, and not only a few stragglers, but flocks consisting of fifty birds, all, apparently, in nuptial plumage.

To Mr. Williams, then, is due the credit of discovering this bird frequenting the Dublin coast, at a period of the year when it was supposed to be away north, and I hope this investigation will receive the publicity of ornithologists. I am much indebted to him for his interesting information, and in a recent letter, he further informs me that he has seen the birds on several occasions during July 1907 and July 1908. But interesting though this discovery may be, it hardly seems to point to the fact that the birds might remain to breed within the confines of the British Isles. Indeed, there is every reason to think that

the Sanderflings here recorded were non-breeding birds, for they were seen in flocks rather than pairs. As yet I have not had the opportunity of examining the genitals of the specimens which Mr. Williams obtained in July, but may remark that in several which I collected on the 16th August 1899, and again on the 7th August, 1900, all in apparent nuptial plumage, both ovaries and testes were minute and undeveloped. Here, then, the more positive evidence in the form of ripe ova which I found present in a Turnstone, shot in July, is wanting.

Turning again for a moment to the latter species, I would point out that in as much as it occurs in two distinct phases of plumage during the height of the breeding season, indeed throughout the summer, the question of the possibility of its breeding in Ireland should not be lost sight of. The phases of plumage assumed are:—(a) a plumage apparently similar to the dress worn during the first winter; such, I believe is assumed by birds one year old; (b), a highly variegated plumage, apparently similar to the nuptial plumage, which one would expect would not be assumed until the birds were two years old.\* *A priori*, one would expect the latter birds to breed somewhere or other; if not in our latitudes, why have they passed northwards? To return to the Sanderling, here the case is different. We have not external evidence to show that the so-called 'nuptial-plumed' birds, seen in summer are really other than immature, that is to say birds one year old. For after the first autumn moult the *bird of the year*\* follows closely the plumage of the adult. Indeed, it is almost impossible to distinguish the two forms of plumage when the birds are on the strand, as only the wing coverts and tertials of the former show signs of immaturity. During the ensuing spring, the freckled and variegated markings of chestnut, brown, and black come out on the head, neck, and upper parts, and the birds to all intents and purposes have assumed the nuptial plumage. In the absence of a thorough histological examination of the reproductive organs which I hope to have the opportunity of carrying out, I venture to say

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\* But I would say guardedly that, in the absence of positive information, it is conceivable that the so-called 'nuptial-plumed' birds are in reality immature, and only one year old. That is to say some immature Turnstones may assume a nuptial-like plumage; others not, in their first year, just as the 'hood' of the Black-headed Gull appears in some, and not in others of this species in the first Spring.

\* Bred in northern latitudes, and not arriving in Autumn till early September.



that it is more than likely that the Sanderling, while assuming what is practically similar to the nuptial plumage when only one year old, at that age it does not breed. In this way its migratory movements are brought into line with those of other LIMICOLINE birds, which, in a great body, push northward in spring. The really mature birds pass us *en route* for more northern climes ; those that are immature, whether they have assumed a nuptial-like dress or not, tarry behind, and may be seen collected into small wisps or flocks on various parts of our coasts throughout the entire summer.

For example we find, on the one hand, hundreds of Dunlins in apparent nuptial plumage, with their conspicuous black breasts ; on the other hand, numbers of Bar-tailed Godwits, in plumage apparently similar to that worn during the winter, remaining throughout the summer along our coasts. Such I believe are instances of species which do not breed when one year old, and this appears to me to be the general rule.

In conclusion I may add a few words regarding what we somewhat loosely term the ' tameness ' of shore-birds on certain occasions when on migration. With few exceptions, notably the Phalaropes, and in a much less degree the Dunlin, and perhaps the Ringed Plover, shore-birds, as a race are wary, and do not allow of near approach. It is true that the immature birds are, on the whole, not so shy as the adults, but some, for instance, the Redshank, Greenshank, and Curlew are always wary, except on their breeding-grounds.

Whether immature or adult, shore-birds on migration usually arrive on our slob-lands very tired-out, and that this fatigue is due almost entirely to the prolonged exertions of the wing-muscles during vast flights over sea, is evident from the way in which these birds will try every method of escape before taking wing. Sometimes they will race along the strand for a hundred yards or more when pursued, and will even take to the water and swim a short distance, especially if a sand-bank be close by. At other times they will remain crouched until almost walked over, and on a breezy day will suffer themselves to be carried with the wind, the wings being hardly brought into requisition. Any one who has made a special point of watching shore-birds just after their arrival, cannot fail to be struck with their tired, apathetic appearance, their silence, and the dislike they evince to taking wing.

Nothing could be more conspicuous than this to the trained eye, accustomed as it is to the remarkable activity on foot and on wing of LIMICOLINE shore-birds.

Well do I remember the extraordinary 'tamelessness' of a Bar-tailed Godwit, the first that I had met. When a lad of nineteen, I was walking along the damp grass-grown edge of the slob-lands of the North Bull, early in the month of September, when, suddenly, a rather big-looking bird, with long legs and beak, popped up from a drain, and ran in front of me. From its demeanour it looked more like a domestic fowl running from the farmer, than a wild shore-bird. Suspecting it to be wounded, I gave chase, and only to avoid actual capture did it take wing, again alighting a few yards further off.

Being at that time anxious to collect as many species as possible from Dublin Bay, and unacquainted with the fact that the bird was plentiful in autumn and winter and obtainable at another time without difficulty, I entreated a passing gunner to procure it for me.

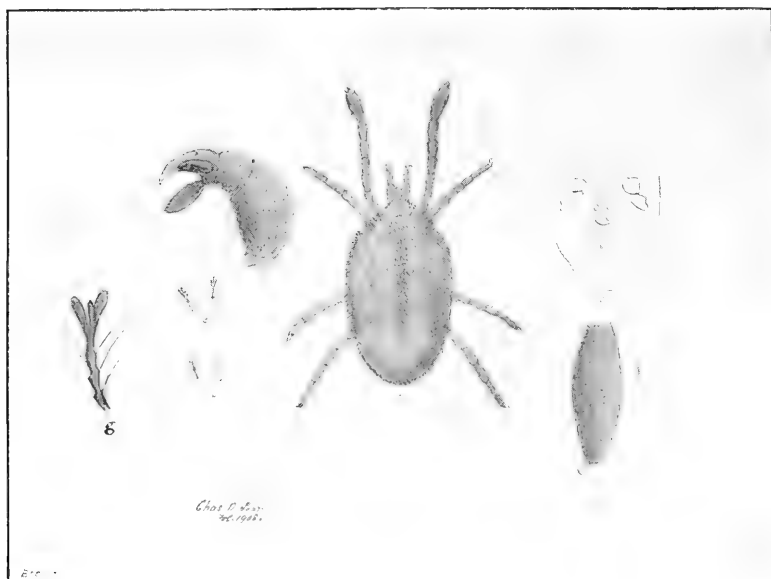
Looking back, this act seems unsportsmanlike; however, I preserved my specimen, which, as far as plumage is concerned, could not have been more perfect, displaying an unusually rich buff shading on the under parts.

On skinning the bird, I found how emaciated it had become from its journey, further evidence that its 'tamelessness' was due to fatigue. Since then I have frequently come across 'tamelessness' in many species, notably in the Curlew-Sandpiper, the Knot, the Wimbrel, the Golden and the Grey Plover, in every instance due to the circumstance above described.



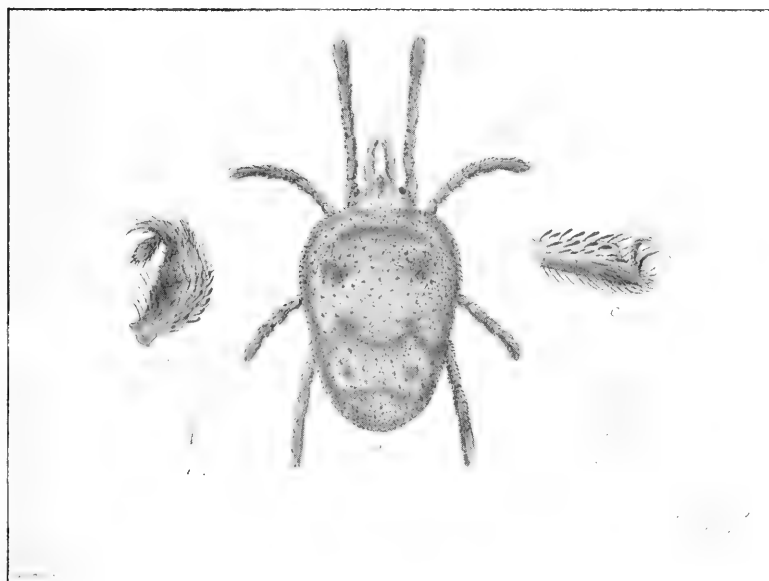
**My Life: A Record of Events and Opinions,** by Alfred Russel Wallace. New edition. London: Chapman & Hall. 408 pp., price 6/-.

Not since 'Huxley's Life and Letters' appeared have we been so interested in reading the life-story of a naturalist, as we have been in the present volume. It has the further advantage of being an autobiography, and consequently we get first-hand, Dr. Russel Wallace's own narrative of his glorious career. In the present edition, some of the items not directly relating to the author have been omitted, and consequently it is a much more handy form than the first edition. In many respects Huxley's life was similar to that of Wallace. Both have had their hardships and trials; and Dr. Wallace's account of his early days, and of his financial speculations, are full of useful lessons. To the naturalist, however, his descriptions of his four years in the Amazon Valley, his visit to the Malay Archipelago, etc. will perhaps appeal the most; though to some, his racy descriptions of Lyell, Darwin, Huxley, Spencer and others will be of extreme interest. But there is not a page in the volume which has not some useful or interesting piece of information. It is plentifully illustrated by photographs, sketches, etc., and is well produced.



*a. Ottonia ramosa.*  
*b. Palpus.*  
*c. Part of ventral surface.*

*d. Last segment of first leg.*  
*e., f. Hairs of body.*  
*g. One highly magnified.*



*a. Ottonia bullata.*  
*b. Palpus.*  
*c. Last joint of hind leg.*

*d. Hair of leg.*  
*e. Hair or papilla of back, highly magnified.*



## SOME BRITISH EARTHMITES.

*Trombidiidæ*.\*

(PLATE IV.)

C. F. GEORGE,  
Kirkton-in-Lindsey.

IN 1877, Professor Kramer initiated a genus, or sub-genus of Trombidium, which he named *Ottonia*, the distinction being based on the fact that the eyes had not the long petiole as in Trombidium, but were rather embedded in the skin of the cephalothorax. I take it that the mite I am about to describe belongs to the sub-genus, I call it therefore *Ottonia ramosa*. So far as I know, it has not previously been figured or recorded. It is a rather small mite for a Trombidium. Mr. Soar gives the length of the body as 1.28 mm., and the breadth .38 mm. It is of a rose madder colour with a dash of pink, very beautiful; in shape, it is something like *fuliginosum*, but not quite so elongate, the distal end of the fourth joint of the palpus is furnished with two distinct claws, (see Plate IV., figure B). In *holosericeum* and *fuliginosum*, it is single (see in 'The Naturalist' for 1908, figures on page 333 and Plate XLII.).

This peculiarity seems to be the rule in the smaller species of Trombidium. The eyes are each provided with two ocelli and are embedded in the skin of the cephalothorax, the distal joint of the fore legs is larger than the others, club-shaped, and flattened sideways (see figure D). The other legs are formed on the same plan as the mites already described; they have not the peculiar footpad found in *fuliginosum*. The female genital aperture has the usual copulatory discs, three on each side (figure c). The papillæ on the body are most remarkable; they are all rather coarsely barbed, but many on the back, and especially those at the sides and posterior part of the body, in addition to the barbs, have the ends divided into two, three, or more branches (hence the name *ramosa*). These branches are almost as thick as the main stem, and look more or less like tassels (see figure E., F. and G). The papillæ are not placed so close together as in some mites, and seem to be arranged in irregular longitudinal rows. When the mite is mounted in Canada balsam, without too long preparation, the colour is retained to a considerable extent in the papillæ, which then

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\* For previous papers see the 1907 volume of 'The Naturalist.'

look very handsome. Hermann, in 1804, pointed out the value of the papillæ as characteristic marks of species, and gave figures of several of them in his great work. Mr. Soar, in May 1894, and Mr. Wm. Evans, of Edinburgh, kindly sent me a most beautiful specimen of it last year. Evidently it is widely distributed.

*Ottonia bullata*.—This pretty little mite was sent to me alive, by Mr. W. Evans, of Edinburgh. It was of a fine scarlet lake colour, and under a low power of the microscope it looked very rugged. This appearance is produced by the structure and arrangement of the hairs or papillæ, which are very remarkable, and characteristic. When highly magnified they seem to be little hollow globes, with a circular opening at the top, and a stalk at the bottom, which fits into a socket like a candle in its stick; the flange of the candlestick being cut into several teeth or leaflets, something like the calyx of a flower (see figure E). The globular part is covered with minute hairs, which project beyond the circular opening; and are generally arranged in rows from above downwards, forming lines similar to the meridian lines on a globe. The papillæ vary in size, and are not arranged in lines, but in irregular rosettes or circles. The mite also has other remarkable hairs, such as those on the under side of the palpi (figure B.), which are finely pectinated; and again others flattened rather feather-like towards their distal ends, as in figure C., on the upper side of the legs and palpi. The eyes are very prominent, and situated on each side of the cephalothorax. The palpi have two claws at the distal ends of the fourth joint. The legs are as usual, rather short, the fore ones being slightly the longest, and have the last joint clubbed, and slightly longer than the others. They are without the peculiar foot-pad between the claws possessed by *T. fuliginosum*. The sternite is also peculiar, but is not shewn in the figure. When mounted in Canada balsam, a good deal of colour is retained, and the papillæ seem to alter slightly, becoming less globular, and more cup-shaped, like Mr. Soar's drawing (figure E.).

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We have received from Mr. R. W. Goulding, of Louth, a copy of a most interesting paper, read to the Louth Antiquarian and Naturalists' Society. It is entitled 'The Building of Louth Spire, 1501-1515,' and is based upon information obtained from the earliest volume of the Louth Churchwardens' accounts. The Spire is built of Ancaster Oolite, quarried at Willeffurth (= Wilsford), Keylby (= Kelby), and Hessilburgh. The total cost of the work appears to have been £305 7s. 5d.

## TWO ANCIENT BURIAL CAIRNS ON BRIMHAM MOOR, YORKSHIRE.

A. LESLIE ARMSTRONG, P.A.S.I.

By permission of the Right Hon. Lord Grantley, I was enabled to make a careful examination of two of the ancient burial mounds of 'Graffa Plain,' Brimham Moor, on Tuesday, August 4th, 1908.

Mound No. 1, of circular form, and about 12' 0" in diameter, is situated about 150 yards north-west of the first large group of rocks, upon the south-eastern boundary of the moor, and about 50 yards south-east of the trackway leading to 'Riva Hill Farm,' and it occupies the summit of a slight hillock, upon a comparatively level portion of the heath, which rises rapidly to the south of it in a bold sweep, terminating in the outstanding rocks of Graffa Crags and Brimham Beacon.

The entire absence of any heather upon the mound, and the profusion of bright green bilberry plants which covered it and at the same time rendered its outline more noticeable, told plainly of a different character of subsoil from that of the surrounding moor; but prominent as the mound appeared, its actual elevation was deceptive, being barely two feet above the natural level, and the uneven character of the upper surface suggested previous disturbance to be more than probable. A few attempts to pierce the crown, however, proved it to be a cairn, constructed of large stones, and accounted for the prolific growth of the rock-loving bilberry which overspread it, as well as for the uneven character of the surface.

The thick green covering was carefully stripped off in lengths and placed on one side, and the few inches of vegetable earth removed, revealing the cairn in an almost perfect state, formed of a series of large stones placed methodically in concentric rings, each stone slightly inclined towards the centre, and the whole mass interlocked together by their own weight. Large stones were placed around the outside forming the enclosing circle, which is almost invariably found in the case of earth-built tumuli, and a few of these had been visible before the covering was stripped.

The construction of the cairn rendered it necessary to remove the stones from the outer ring first, and to work gradually towards the centre where the burial, if such existed,

might be expected to lie. This proved no easy task, as the stones were so tightly wedged, and had each apparently been specially selected for the purpose. Almost without exception, they were about a foot in diameter, oblong or oval in form, and three to five inches in thickness, with flat surfaces and rounded edges. No marks of tools were visible on any, but all alike were either water-worn, or had been especially rubbed to their present form. The stone itself was the Millstone Grit of the surrounding moor, but fragments of stone of the form composing the cairn are not now to be found thereon readily, although a careful search might reveal such. Personally I am inclined to think that they have been transported from a considerable distance; that great care has been exercised in their selection is indisputable.

When nearing the inner radius of the cairn, small fragments of charcoal were noticeable, but they were by no means in large quantities. There was also a layer of fine grey sand an inch or two in depth, which had apparently been spread over the natural surface of the ground, and the stones bedded therein. Sand of this kind is abundant in the vicinity of the rocks upon the moor.

In the centre, large pieces of stone were piled around a rough circle of about 3' 6" extreme diameter, and within these, large and small stones, all of the form previously noticed, were laid more or less upon their flat surfaces, and amongst them the grey sand and charcoal were very evident; pieces of the latter up to an inch square, being found.

Upon the gradual removal of this central mass of stones, the presence of the unmistakable black 'barrow earth' became evident in a slight layer, perhaps an inch or an inch and a half in thickness, and spread over the whole area within the inner ring, the bottom of which had been paved with large flat stones. Amongst this earth very slight traces of a greyish white paste-like substance were visible, probably the decomposed remains of the bones after calcination. The deposit was carefully gathered together. Its removal bared the large stones forming the bottom of the grave, and these proved to be two in number, the largest being about 2' 0" across, and of a somewhat angular form; strikingly different to those composing the cairn itself, for the edges were rough fractures, not rounded in any way. Apparently the surface soil had been removed from the ground upon which the cairn was built, for the upper



face of the two stones forming the bottom was level with the natural ground surface adjoining, so far as could be ascertained, and these had apparently been laid down for the reception of the deposited remains.

As there was every reason to believe that some portion of the ashes might have been placed in an urn, efforts were made to raise the stones above mentioned in hopes of a discovery. This was by no means easy, but by care and perseverance, it was at last accomplished, but only to meet with disappointment. Immediately beneath was a slight layer of ashes upon the natural ground surface, which latter showed very evident signs of fire, the bright yellow sand composing the substratum being calcined to a dark red colour for quite 2" in depth. This sand was very stiff and compact. The most diligent search failed to reveal any trace of a hole or other disturbance at any point, or of any implements which might have accompanied the body, either upon the surface or amidst the cairn.

One stone found amidst those immediately covering the deposit, was remarkable because entirely different from all the remainder composing the cairn, and appeared to have been shaped with some definite object in view. It was a fragment of hard sandstone, in the form of a truncated pyramid, the sides and top being roughly fractured to shape, but the base was quite smooth, and bore marks of friction. The base measured 6"  $\times$  5", and the height about 4½". This might have been used as a crushing and grinding stone for grain, or for rubbing purposes, but careful search failed to reveal its companion slab. With this exception, nothing was found that could be considered as having been fashioned for use, and there was nothing to throw any light upon the probable period of the cairn's erection.

The second tumulus examined is situated about 100 yards south-west of the first. It was of rather irregular shape, and appeared to have been somewhat disturbed, but the original diameter had probably been about 9' 0". Upon examination, it also proved to be of the cairn type, and apparently similar to that previously opened, but it had been disturbed throughout at some distant period, and no trace of the deposit could be found, although the yellow sand forming the substratum was noticeable, calcined over the whole area as before. There were also traces of charcoal. It is remarkable that amidst the smaller stones of this cairn another 'rubbing stone' was found, almost identical with that in the former one, and similarly, this proved

to be the only 'find' of any description bearing certain traces of man's handiwork.

Although somewhat disappointing not to be able to assign the erection of these cairns to any definite period, yet their examination proves valuable for two reasons. First it places beyond any question the nature of the mounds scattered over this portion of Brimham Moor, which is known by the name of 'Graffa Plain,' a name which the late Mr. William Grange translates as 'the place of graves'—significant in itself, though he at the same time casts a doubt upon the formation of the mounds in question being anything other than natural. The identity of the grave mounds being established, they prove that a settlement of primitive man of no small magnitude must have been located somewhere in the vicinity.

**'Saint' Gilbert : The Story of Gilbert White and Selborne,** by J. C. Wright. London : Elliot Stock. 90 pp., 2/6.

In this little book the author adds one more to the many dealing with that prince of naturalists, Gilbert White. We cannot say that the volume contains much that is new, but it is obviously written by one who appreciates White's worth to the full. He describes Selborne and its objects of interest, and then gives some account of White himself, and of his methods. There are eight illustrations. We don't like the word 'Saint.'

**British Birds and their Eggs,** by J. Maclair Boraston. London : W. & R. Chambers, 1909. 301 pp., price 6/- net.

Whilst the author of this book has certainly not chosen anything new in the way of either subject or title, he claims to bring forward 'a new method of classification.' He points out that other books are arranged according to genera or species, or merely in alphabetical order; but how can a beginner 'be expected to turn to identify a bird in a book wherein birds are grouped according to generic distinction, about which, as yet, he knows nothing?' The birds are consequently grouped under such headings as 'Black-and-White Birds,' 'Ruddy-breasted Birds,' 'Trunk-climbing Birds.' Whether this method of classification is the best, or whether it is entirely new, we are not prepared to say; but we imagine we know of one writer who will claim that he has adopted this method for some time! Under 'black birds' there are Rook, Raven, Carrion Crow, Chough, Jackdaw, etc.; but we find that the Scoter must be looked for under 'Diving Ducks,' and the 'Swift' is under 'Swallow and Swallow-like birds.' In some of the other divisions, cross references are more complicated. Each species appears to be described in a way suitable for a beginner; and, following the account of the bird itself, there are notes under 'Eggs,' 'Nest,' 'Distribution,' etc. There are no fewer than 136 coloured plates, which will do for a beginner, and probably answer his purpose. These must have been very expensive to prepare, and consequently it seems a pity they are so poor. Most of the birds are surrounded with a halo, and they are usually perched in mid-air, in a cotton-woolly atmosphere. Whilst many are passable, some are really vile—the Bullfinch and Wheatear being coloured like the patches on Joseph's coat. We don't quite know what to say of the House Martin and its nest (plate 58). There are sixteen coloured plates at the end, upon which illustrations are given of the eggs of *all* British breeding birds. In each case, we are informed, they have been drawn and coloured from the shell. The volume is a substantial one, and cheap at 6/-.

## SOME LINCOLNSHIRE BOULDERS.

F. M. BURTON, F.G.S., F.L.S.

My attention has recently been called by the Rev. C. E. Laing, the Vicar of Bardney, to some boulders on the side of a drain, about three miles from that village. On going there to see them, I found two of considerable size—No. 1, 5 ft. 2 in. by 4 ft. 4 in., and about 2 ft. 6 in. deep; and No. 2, 5 ft. 8 in. by 3 ft. 2 in., and about 2 ft. 6 in. deep. Both boulders were fast embedded in the ground, and the depth measurements were taken by probing with an iron rod at their sides.

The soil in the locality consists of Kimeridge Clay, with a thick covering of chalky Boulder Clay on the top.

The drain, on the north side of which the boulders lie, is in the parish of Bucknall, not far from Bucknall Bridge. It was excavated about sixty-three years ago, as old inhabitants who helped in its construction affirm, to connect an old drain—coming from Minting and Gautby—on the west with the Stixwould drain on the east, and thence into the Witham river. Before this time, this old drain joined the river at Southrey, and traces of its former course are still visible.

No 1 boulder, which is not unlike a block of Lias limestone in appearance, is highly fossiliferous; the fossils lying in heaps, broken up and cemented together, with few entire ones, chiefly *Cerithiums*, amongst them.

No. 2 is a hard sandstone, and has scarcely a trace of a fossil in it.

On a second visit to the spot, I met with several more boulders, (Nos. 3, 4 and 5), embedded, like the first two, on the north side of the drain. No. 3 measures 2 ft. 5 in. by 2 ft., but the ground, for want of rain, was so hard, that the depth of the boulder could not, with any certainty, be ascertained. No. 4 measured 3 ft. by 1 ft. 11 in., and about 2 ft. deep; and No. 5, 3 ft. by 2 ft., and about 2 ft. in depth. All three were of similar substance to the sandstone boulder No. 2. From the uniform depth of all these boulders, it may be inferred that the matrix they have come from will turn out to be a narrow band of rock about 3 ft. in thickness.

On referring to Mr. Wheeler's 'History of the Fens of South Lincolnshire,' I find that the area north of the Witham in this district, including Bardney, Southrey, Tupholme, Bucknall and Stixwould, was drained under the Act of 1843, which confirms

the testimony of the old inhabitants as to the time when this Bucknall connecting drain was made. Mr. Wheeler, writing to me on the subject, says, 'the boulders you mention are no doubt kinsmen of those found when the New Cut for the Witham was made.' This is referred to in his book as follows:—'In the excavation for deepening the Upper Witham, some boulders of Lias limestone and sandstone were found, the largest of which was about 6 ft. by 4 ft., and 2 ft. 6 in. deep.'

No 1 boulder, from its appearance, seemed to me to differ from the remaining four, but, from the interesting account of them given by Prof. P. F. Kendall, they are all, doubtless, from nearly the same source; and, in all probability, those Mr. Wheeler mentions had the same origin also.

The fossils contained in the boulders, with a few loose ones lying about on the ground all in fragments, have been identified by palæontologists in the Jermyn Street Museum, and, through the kind aid of Mr. G. Barrow, I have received the following particulars:—

No. 1 boulder—Fragments of Ammonites, Gasteropods and Lamellibranchs. *Pecten lens* Sow? *Ostrea* sp. *Cerithium* sp.

The four remaining boulders are of sandstone, with fragments of Lamellibranchs. Loose fossils—*Am. (Perisphinctes) varicostatus* Buckl. Nodule shewing septarian structure and *Am. (Cardioceras) cordatus*, with *Serpula* sp. attached.

This last, Mr. Barrow allocates to a bed he knows well, a *limey clay band with Vermiculites*, a type of thing from the base of the Ampthill Clay, just over the top of the Oxford Clay (thus proving its near local origin). The large ammonite and the clay band nodule (he adds) probably came from the same area.'

As to the matrix from which the boulders were derived, Prof. Kendall has identified them as all coming from the same source, the Spilsby Sandstone. 'Your boulders,' he writes, 'are more interesting than you think. There is no such variety (referring to No. 1) known *in situ* in Lincolnshire, but I have found very large boulders, greatly resembling yours, though far more fossiliferous, and having the fossils most beautifully preserved. They occur in a train extending from near Donington-on-Bain away southward and westward into Cambridgeshire, Norfolk and Northamptonshire, though not in the fossiliferous

aspect ; there is, however, another test by which I can recognise them, namely, by the presence of lustre-mottling.'

Referring to a large boulder he met with, like No. 1, he writes further : ' My boulder was found near South Willingham Station, and I recorded it in " Proc. Geologists' Association," Vol. XIX., Part 3, p. 126. It agrees precisely with yours in general aspect, mineral condition and fossils, as you will see from the specimen I send you for comparison. It is a calcareous sandstone, with local developments of calcite, enclosing the sandy grains in such a manner, that, when broken across, lustrous fractures showing the cleavage of calcite, but crowded with sand-grains, may be seen ; this is what is termed " lustre-mottling." The patches seem to be in the form of rather acute rhombs, as though the calcite were in the form of dog-tooth spar—this character of lustre-mottling appears in the typical Spilsby Sandstone of Spilsby.

' As to the fossils (No. 1 boulder), taken as a whole, they have a remarkably Kimeridgian look, reminding me of the beautiful Kim. fossils, obtained from the pits at Market Rasen, but there are significant differences. Ammonites of the *biplex* group are very abundant ; your specimens show crushed examples, but my own include exquisitely-preserved specimens. I have, too, the cast of a very large ammonite, with smooth outer whorls. *Pectens* resembling *P. lens*, are not uncommon ; there are also forms like *Modiola*, and beautiful *Astartes*, very like the species common at Market Rasen. *Cerithium* is the only common gasteropod.

' The Sandstone you sent ' (alluding to chippings from boulders Nos. 2, 3, 4 and 5), ' is clearly another aspect of the same rock, and it is not unlike some of the Spilsby Sandstone of the country about Six Hills.'

The five boulders here described have not, from what I can learn, been previously recorded, nor is this, for various reasons, to be wondered at. When they were first laid bare in the ' forties ' of last century, the results of ice-action were comparatively unknown and uncared for, and everything since then has been against their discovery. Though of considerable size and not far from a public road, they cannot be seen from it, nor from Bucknall bridge, which passes over the drain. The locality is little frequented except by field-labourers and villagers. The bank on which the boulders lie is now, and has been for years past, overgrown with briars and thorns, long grass

and other coarse herbage ; and had it not been for the giving-way of the soil, thrown up on the south of the drain when it was first made, the repairs to which attracted Mr. Laing's attention, they might have remained undiscovered for an indefinite period. So quiet indeed is the spot, that Mr. Laing and some members of his family had the pleasure of watching a litter of foxes playing under the roots of one of the old thorn trees on the side of the bank, near where the boulders lie—proof sufficient of the solitude of the place.

My best thanks are due to Mr. Barrow and Prof. Kendall for their valuable aid in unravelling the nature and origin of the boulders ; to Mr. Wheeler and others for the information they have supplied ; and to the Rev. C. E. Laing, for bringing the boulders to light. If Incumbents in the country would note any disturbances of the land-surface in their respective parishes, and call attention to them, as Mr. Laing has done in this case, much of interest that would otherwise be lost might sometimes be the result.

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**The Romance of Modern Geology**, by E. C. Grew. London : Seeley & Co., 1909. 308 pp., 5/-

In this well-written volume the editor of 'Knowledge' gives an entertaining account of the study of the earth from the earliest times to the advent of man. By comparing our sphere with a golf ball, he makes simple what is usually difficult to explain in a popular way, regarding the early history of our planet. A strong feature of the book is the description of the various extinct animals. This is done in a very careful and pleasant manner, and is illustrated by reproductions of the remarkable drawings which appeared in Knipe's 'Nebula to Man.' The book is prepared for young readers, for whom it will prove exceedingly attractive ; and there is much in it that will appeal to older people.

**Nature near London**, by Richard Jefferies. London : Chatto & Windus. 212 pp., 5/- net.

In wading through the wealth of 'nature study' literature that is now at our command, one frequently feels like tramping through a desert, and gets weary of the monotonous stuff which the would-be Gilbert Whites have thought fit to have printed. But now and then, like a gem in the sand, a real treasure is our reward ; we find a writer with a soul, whose pen can express his thoughts. Such a writer was Richard Jefferies. To read his books is to know what Nature really is, and to learn what one of her devoted sons has seen and heard. In 'Nature near London' we have one of these refreshing volumes ; in it are described what only Jefferies could describe so well ; and to read it leaves one wondering that even he could find so much that is beautiful near that most un-Nature-like place. Would that for our great crowd of book compilers we could exchange but a few like Richard Jefferies, and our literature would be the richer, we should be the wiser. In the present work we have a companion to 'The Open Air,' recently reviewed in these columns. It is as tastefully produced, and is illustrated with a dozen coloured plates by Ruth Dollman, who has well interpreted the scenes described by the author—the plates 'When the June Roses open on the Briars,' and 'A great Hawthorn Bush grows on the Bank' being superb.

# THE OXFORD BRITISH PLANT LIST.

G. CLARIDGE DRUCE, M.A., F.L.S.,  
Oxford.

IN the very masterly review of the above work, from the pen of my old friend Dr. Arnold Lees, in which he has been so very appreciative a critic (a marked contrast from that adopted in certain other quarters, where the vantage ground of knowledge of field botany was not so evident a standpoint), the writer singles out points on which I may be able to add some information.

First, *Rhinanthus grœnlandicus* Chabert; this was only made known to me after my list had been printed off. It is in the new 'Addenda' with many others. Doubtless the micro-species of this genus and *Euphrasia*, etc., are out of proportion when compared with the species of *Melampyrum*. In fact, I think with Dr. Lees, that too great prominence is given to them. The difficulty is in grouping them. I at first, thought of choosing another type for the subordinate species, and in a second edition, I may do so, but eternal vigilance is required in avoiding mistakes when several types are used. The 'micro-species' of *Rhinanthus* appear fairly constant: *borealis* is a high northern plant, with broader leaves than the other small alpine *Drummond-Hayi*. My name simply appears connected with them from the fact that Dr. Sterneck described them as species of the genus *Alectorolophus*, while I use the generic name *Rhinanthus*, although *borealis* and *monticola* were first found by me. It is quite possible that the latter will be found on the Yorkshire moors, and the former possibly on the higher hills. It is distinctly alpine.

Dr. Ostenfeld has recently suggested that *Euphrasia foulaensis* and *scotica* are really forms of the widely-spread continental *E. minima*, of which indeed, a form has recently been found in Somersetshire. The mountain forms of *Rhinanthus* already alluded to, are absolutely native, and occupy areas untouched by man. The name *R. Perrieri* Chab. as given in one of the other lists, cannot stand. Chabert established it on a character which is common to many of the forms not necessarily restricted to *rusticulus*. For that reason, Dr. Sterneck adopted the latter, and as the species name, which also is due to Chabert.

*Orobanche arenaria* is omitted from my 'list' because there is no satisfactory evidence of its ever having been found, as

Mr. Lester-Garland long ago pointed out in 'Rep. of Exch. Club,' the character [which Babington] relied on to separate it from *O. purpurea* was valueless. I think Babington's plant may be the *Spitzelii* of my list, but as yet, I have not been able to see Babington's type. The '*arenaria*' of a good British botanist from Guernsey is *O. amethystea*. In this genus we have plenty which appear to be in a state of flux, and really definite characters are difficult to find, which are constant. In some instances, it may be the host has a modifying influence on its unwelcome guest, or it may, as in the *Hieracia*, *Kœleria*, *Taraxacum*, etc., species are in 'the making,' and not yet firmly fixed. My var. *alpicola* Reichb was so large a flowered form of *Pinguicula vulgaris* that Boswell Syme at first was inclined to refer it to *grandiflora*. It occurred in Western Ross.

*Poa cenisia* All. b. *flexuosa* (Wahl.) given in 'Lond. Cat.', should be deleted. Hackel at first referred the plant I gathered on Ben Lawer to *cenisia*, but on my obtaining more examples he, and I have no doubt correctly, said No. I published the correction in the 'Ann. Scot. Nat. Hist.' It is true Mr. Fisher said he thought the specimens were a new form of *P. arctica*, and he promised to go into the matter, but beyond losing my type specimen, I have heard nothing more from him about it, and his opinion cannot override that of the great systematist. There is little doubt that the plants were an extreme alpine form of *Poa pratensis*, with large flowers. Hackel himself named my specimen of *Festuca dumetorum* L., closely allied, as Dr. Lees says, to *F. rubra* L.

The fern *Botrychium lanceolatum*, rests on very slender evidence. It was supposed to have been found on the sands of Barrie, in 1839, by a Mr. Cruickshank, who sent a *drawing* of it to Newman (see 'Brit. Ferns,' Ed. III., p. 32), who referred it to *B. rutaceum*. No one has refound it, nor do the specimens of Cruickshank appear to be in existence ('E. B.', XII., p. 29). Perhaps I ought to have put it in my list in brackets, but the same might be said of *Ranunculus gramineus*, *R. alpestris*, *Carex brizoides*, etc., but space had to be considered.

I hope, at no distant date, to deal with the reported plants of Britain, which have not been verified, so that a list of them with the evidence on which they have been reported, may be available for consultation. I should much like to see the Yorkshire *Inula britannica* L. I have the species from Groby Pool, Leicester, and have gathered it in Austria, etc. It is



not like *Helenium* at all, and essentially differs in the achenes being *hairy*, not *glabrous*. The lower leaves are from  $\frac{1}{2}$  to  $\frac{3}{4}$  of an inch. broad, not 6 to 8 inches, as in *Helenium*. Loudon, excellent as he is, has not space to give an adequate description of the plants, and he omitted the *special*, and indeed also the *group* characters, the latter being *Folia involucris, apice dilatata, = spathulata*, in *Helenium*, whereas in *I. britannica*, which is in the section *Enula* Duby—' *Folia, involucris interiori apice acuminata.*'

The 'permanence' of the trivial name, which is a botanical rule, led me to choose the badly descriptive name *paniculatum* for the broad-leaved Cotton Grass. It was called *Linagrostis paniculata* before it was named *Eriophorum latifolium* Hoppe. But a good many battles will have to be fought before we get even our British plant names correctly.

## —◆◆— ADDITIONAL NOTE.

F. ARNOLD LEES, M.R.C.S.,

By way of rider to the foregoing, I would add certain facts, privately communicated by G. C. Druce, which should prove stimulating to those North of England Field Botanists, who are inclined not to hide their light under a bushel. We have at least three 'new,' undescribed British Plants, and two of them Yorkshire species! to which attention should be called, and herbaria examined for with as little delay as possible, so the results may appear in my Supplement. These are:—

1. *Montia lamprosperma* Chamisso, the *shining chestnut-brown faintly reticulate* seeds of which have been detected in Leaf-bed deposits by Clement Reid, as well as the *dull black* ones of the *M. fontana*, and the *shining black reticulate* ones of *M. rivularis*. Mr. Druce says *M. lamprosperma* seems a quite distinct species, as in it the ' *Flowers are free* ' whereas they are joined, not free in the hitherto accepted British forms. The semina are very imperishable so that dried specimens on herbarium sheets can be easily needled over for ripe non-cast seeds.

2. *Orobanche procera* Koch (a form of *reticulata*, Wallroth), which grows tall upon Thistle, *Carduus eriophorus* in West Yorks., and ' *Centaurea* ' (?) in Lincoln at Summer Castle. It is to the obstinate acuteness of Mr. H. E. Craven, of Roundhay, who forced its non-agreement in character with *O. elatior* Sutt.,

upon my and Mr. Druce's attention, that we owe what Druce calls this 'splendid' addition to the British and York flora. It grows tall, the regularly curving trumpet-mouthed corollas are very glandulous-hairy, and massed on the upper third of the spike; and has occurred several times of late years in the Thorner district.

3. The other species is *Arenaria stellarioides* Willd.—a colonising-alien from the Caucasus and the Euxine, probably brought first to the Halifax, and later Elland and Mirfield riparian area (1895-1908!), along with foreign barley, but since noticed thirteen years back it has spread down the waterway of Calder. It seeds freely, branches dichotomously, has Stitchwort-like leaves, and starry, white-petalled flowers of some degree of showiness. According to Nyman, its synonym is *Arenaria cerastoides* Poiret non D.C. The *Stellaria arenaria* L., for which I took it is the *A. spathulata* Desf. *teste* Index Kewensis, a species of Spain and North Africa.

I may add that our Yorkshire Stations for the *Elecampane* want verifying.\* The Wilstrop siding one had lanceolate lower leaves, the Thorp-Arch broad ones, but I write from memory—it is a quarter of a century since I saw either *in situ*. But in these matters alone, surely there is good work, and enough for our men of York to do in the coming summer—which may we all see!



**Scandinavian Britain**, by **W. G. Collingwood, M.A., F.S.A.**  
London: S.P.C.K. 272 pp., 3/6.

This is a further volume of the 'Early Britain' Series published by this well-known house. So far the books issued comprise one of the most concise and valuable accounts of the early history of our country that we have ever read. They are all written by the leaders of the subjects dealt with. The present one is quite up to the high standard attained by its predecessors, and Mr. Collingwood's name on the title page is a guarantee of its excellence. We regret space does not enable to deal with it to the length that we should like, but we can heartily recommend it as the best account of the influence of the Scandinavian invasion that we have read.

**A Hill Country**, by **Russell F. Gwinnell**. 26 pp., with Geological Map. George Philip & Son, Ltd. 1/- net.

This is a charming lesson in geography and geology; written in a way which will appeal to the numerous visitors to the northern Clyde Basin. The area in question, from its diversity of geological structure and scenery, is particularly suitable to being handled in the way the author's familiarity of the area enables him to do. It can be safely said that Mr. Gwinnell has taken full advantage of the very important lessons in the physical features of the district with which he deals; even the place-names adding their share to his narrative.

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\* My son saw it in abundance last autumn in the recorded station near the sea on the north side of the stream at Hayburn Wyke.—J. G. B.

## THE SYCAMORE.

(*Acer platanophyllum*, St. L.).

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P. Q. KEEGAN LL.D.,  
Patterdale, Westmorland.

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THIS massy and stately tree is not a native of Lake-land, although Westmorland is far-famed for its production. In fact, as Wordsworth states, 'it has long been the favourite of the cottagers, and with the Fir, has been chosen to screen their dwellings.' It is frequently observed as an apparently spontaneous outgrowth in sundry wild and sequestered places, as well as in copses, so that we may infer that the rich gravelly soil, the hilly conditions, the open woodland, and the general climatic conditions of the northern districts are well suited to its organic temperament, and respond to the special exigences of its root growth and stem development. Its grand and massive form, the deep tones of its dense foliage, and its easy accessibility render it specially interesting to the student of the chemistry of plants, and as an introduction to that study, no better subject can be found.

STEM.—The wood is moderately hard, and of varying weight (specific gravity 0.57 to 0.74), uniformly white, and with no distinction between alburnum and duramen. The medullary rays on tangential section are pointed spindles up to about 0.7 mm. high, and 5 or 6 cells thick in the middle, the number of rays in 1 mm. of arc is about 12; the vessels are numerous and uniformly distributed, of 60  $\mu$  width, have spiral thickening, parts of their lateral walls are entirely inlaid with bordered pits, while their slanting transverse walls are pierced by simple pores; the fibres have very stout walls, beset with a few simple pits; some parenchyma occurs alongside the vessels.

In the bark the parenchyma forms tangential bands intermixed with sieve-tubes which have a watery 'latex'; the fibres are disposed in the inner bast in a few narrow concentric layers extending between the rays, and almost all the parenchyma cells adjacent to these layers contain a single crystal of oxalate of calcium, while the outer bast and inner cortex are thickly sprinkled with groups of stone-cells richly provided with similar crystals; the pericycle forms a somewhat interrupted ring of fibres separated at intervals by sclerenchyma; the periderm

of rather wide cells is formed in the first year in the sub-epidermal layer, and remains thin and living for a long time, till finally plates of secondary periderm develop below it, and ultimately produce a nearly smooth, hard, dry, chocolate-coloured rhytidome, which eventually splits and peels off in scales. The Sycamore is a starch-tree, *i.e.*, while the starch completely disappears from the bark in winter (mid-November till 3rd March), that of the wood remains only slightly reduced in quantity all the time. A piece of branch  $2\frac{1}{2}$  inch in diameter, felled in February, was examined: the dried bark had a small quantity of white wax with traces of carotin and chlorophyll, there was no resin apparently, the amount of tannin was under 1 per cent., there was a little free phloroglucin, a little pectosic mucilage, and free phlobaphene, a saponin-like glucoside, some cane-sugar, about 10 per cent. oxalate of calcium, and 9.4 ash which had 6.6 per cent. soluble salts, 4.4 silica, 45.2 lime, with traces of magnesia, etc.; the wood showed mere traces of tannin and phloroglucin, and (air-dried) yielded about 0.5 per cent. of ash, which had 32.3 per cent. soluble salts, 4.4 silica, 21.5 lime, 8.7 magnesia and manganese, 3.9  $P^2O^5$ , and 3.9  $SO^3$ . It would seem that none of our ordinary well-known timber or coppice trees yields a chemical analysis quite so meagre as the foregoing. Even none of our sap-wood trees is apparently so poverty-stricken as respects wax, resin, tannin, etc. It is clear that the starch reserve of the Sycamore is for a very long period in life utilized by the cambium for growth in size, and for the evolution of new-shoots, but that it is easily exhausted and spent in the prosecution of this work. Herewith is connected the remarkable production of cane-sugar in the bleeding sap of springtide—the increased tension (osmotic pressure) thereof arising concurrently with the regeneration of the starch in spring, but the outflow effect would be comparatively insignificant if it were not for the remarkable porosity of the vessels and their freedom from obstructive accumulations of gum (xylan), resin, and tylose growths.

LEAVES.—The mesophyll is composed of one long layer of palisades, narrow, and occupying about half its thickness, and a lacunar tissue of irregular cells with large air-spaces; the cells of the upper epidermis contain starch granules, and their inner wall is slimed, the lower epidermis has on the surface a papillose structure, and is coated with wax, the stomatic cells only bearing starch, while simple one-celled hairs appear along the

course of the nerves ; the stomata are of medium size, and have no accessory cells, but are very numerous, their number per square mm. being about 400 ; the leaf is about  $165\ \mu$  thick ; at the base of the petiole the separated vascular bundles form a closed ring, from which nearer the blade other bundles are emitted, making 7 in all. On 8th August the blades held 67 per cent of water, and the dried substance contained 3.5 per cent. wax, with very much carotin, but very little resin or fat oil, 19.8 albumenoids, 3.4 quercitrin and tannin, some free phloroglucin, and glucose, a moderate quantity of pectosic mucilage stained with phlobaphene, no reserve starch (very much in the fresh leaf), much oxalate of calcium, and 11.2 ash which had 26.2 per cent. soluble salts, 14.9 silica, 26.4 lime, 5.8 magnesia, 5.3  $P^2O$  and 4.4  $SO^3$ , there were some manganese and soluble carbonates. The ash of the brown autumn leaves (with petioles) amounted to 12.1 per cent. with 20.7 per cent. silica, 41.9 lime, and 1.1  $P^2O^5$ . The leaves contain inosite, according to Fick. The special feature, however, is the lavish plaster of wax on the lower epidermis, which rapidly separates from boiling alcohol in gelatinous masses ; its formula would be near  $C^{26}H^{16}O^4$ . The early cessation of the foliar vegetation in this species of Maple forbids any exhibition of the magnificent crimson autumnal colouration so admirably beautiful in some of its congeners.

FLOWER AND FRUIT.—The inflorescence assumes the form of a pendulous cluster (raceme) which exhibits every gradation from hermaphrodite flowers with large ovaries to those in which the ovaries are reduced or entirely absent. The pistil consists of two carpels joined to form a flattened two-chambered ovary, with two ovules in each chamber. The floral parts contain no carotin, but have much quercitrin and glucose (the disc glistens with drops of nectar), while the ash of the whole thryse yields 48.5 per cent. soluble salts, 14.1 lime, 3.8 magnesia, 12.4  $P^2O^5$ , 6  $SO^3$ , with traces of chlorine, manganese, etc. In the fruit, which is a double samara (winged achenes), one ovule in each chamber enlarges to a rounded seed, which is wholly occupied by the embryo, and fills up the globular chamber ; the ripe seed is made up of an external tegument (testa) composed of a cuticle, two layers of thin cells, a compressed membrane, and a layer of cells with crystals of oxalate of calcium, also of an internal tegument (tegmen) of five rows of cells ; a refractive plate, which is the relic of the absorbed

nucellus, immediately borders the foliaceous wrinkled cotyledons ; there is no endosperm ; it ripens in September, and about half of the seeds produced are fit to germinate up till two years. The whole fruit contains about 8 per cent. of water, 26 albumenoid, 8 to 10 fat-oil, 2 sugar, 9.5 fibre, considerable resin and oxalate of calcium, 5.5 ash, which has 37 per cent. soluble salts, 2.6 silica, 25.7 lime, 4 magnesia, 8  $P^2O^5$ , and 3.6  $SO^3$ . The reserve materials are aleurone and oil, no starch. When the fruit covers are transparent, so that light can easily enter into the deepest parts of the seed, then a dense homogeneous protoplasm, coloured uniformly green, fills the cells of the embryo. This green pigment was formerly thought to be chlorophyll, but it is doubtful if this seed-green is really identical with or related to leaf-green.

SUMMARY.—There is some similarity between the physiology of the Beech and that of the Sycamore, but in the latter we have to deal with a case of palmate nervation of the leaves. With regard to these organs, we have all the chemical evidence of rapid growth and early decline. The production of starch declines towards the autumn, that of cellulose does not increase, and complete lignification is not consummated till the fall ; the albumenoids and the sugars remain uniform till very late, and there is a heavy fixation of ash with much silica and lime in the old leaf. A special feature is the large quantity of wax coating on the lower epidermis, the cause of which is difficult to assign, but is doubtless connected with a decline of the vitality on that side of the organ. The transpiratory activity is only moderate, and the assimilatory energy is not as great as the sombre green of the foliage would seem to indicate. As regards the stem, the thickness of the liber relatively to that of the wood in older trees is comparatively feeble, which is a sign of defective differentiation ; and notwithstanding that the wood is very fibrous, the lignification of that particular element is very slow, and not completed up till about 80 or 100 years. Moreover, the felled timber is liable to rot when exposed to atmospheric variations—a circumstance which is attributable to a serious deficiency of tannin and resin. However, notwithstanding all these grave drawbacks, the Sycamore manages to endure well and hearty for over two hundred years. That it somehow maintains a remarkable soundness of main body and limb is clear from the fact that it is not subject to maladies like gummosis, or to a partial demise of any of its twigs and young

branches like the Poplars, etc. Year after year with unfailing energy, its magnificent crown rears a majestic arch, and projects a solemn shade; its flowering and fruiting are annually abundant, and fully sustained; and the gaping wounds left by the lopping of its larger limbs are healed up and overgrown with marvellous celerity and completion.

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## FRESHWATER RHIZOPODS FROM THE SHEFFIELD DISTRICT.

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JAMES M. BROWN, B.Sc.

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THE Freshwater Rhizopods, though an extremely interesting group of microscopic animals, do not appear to receive the attention which they deserve. They are to be found very commonly, and in almost all kinds of fresh water; in the sediment of ponds and streams and water-troughs; amongst the floating conferva and weeds; and amongst wet moss. One needs but to collect samples of sediment, weeds and moss in the field, and on arriving home rinse these in clear water and strain the washings through fine gauze. The sediment so obtained will be found to yield numerous species. Sphagnum washings are especially productive, and I have found many forms amongst the green growth on the overflow from water-troughs. The material can be preserved in a healthy state for a considerable time in shallow vessels exposed to dull light, and loosely covered to prevent too much evaporation.

The following species I have found recently in this district, and they will serve as a preliminary list of the most commonly occurring forms.

### Order I.—AMOEBINA—naked forms.

#### Family LOBOSA.

*Amoeba proteus* (Pallus) Leidy. The 'common' *amoeba* occurs frequently in sediment of pools and streams, and amongst aquatic vegetation. Burbage, Stanage, Ringinglow, etc. A large form—probably Cash's var. *granulosa*—in a stream in Ecclesall Woods.

*Amoeba villosa* Wallich. Common, and generally in similar situations to the previous species.

*Amoeba striata* Penard. A form with a distinct external

pellicle. Amongst the mossy growth on the over-flow of water-troughs. Ecclesall, etc.

*Amoeba limax* Dujardin. A small form. Occurs in sediment of pools. Ringinglow and Ecclesall Woods.

*Amoeba limicola* Rhumbler. Occasionally found in sediment of pools. Ringinglow.

*Amoeba verrucosa* Ehrenb. A form with external pellicle. According to Penard, a collective term for several distinct species. Amongst mossy vegetation. Ecclesall and Bamford.

*Amoeba actinophora* Auerbach. A very small species, but highly interesting. Occasionally in sediment. Whiteley Woods and Ecclesall.

*Dactylosphaerium radiosum* (Ehrenb) Bütschli. A small form occurs in sediment (Ringinglow) and amongst floating conferva (Wye at Haddon), etc.

#### Family VAMPYRELLIDA.

*Vampyrella lateritia* (Fresen.) Leidy. A peculiar form parasitic on *Algæ*. Burbage.

*Vampyrella vorax* Cienkowski. A non-parasitic and active species, feeding on Diatoms, etc. Amongst mossy growth on water-troughs. Ecclesall.

Order 2.—CONCHULINA. Forms provided with tests.

#### Family ARCELLIDA.

*Arcella vulgaris* Ehrenb. A very common species amongst aquatic vegetation.

Var. *compressa* Cash is rare. Occurs in Sphagnum pools, Ringinglow.

*Arcella discoides* Ehrenb. Amongst Sphagnum. Ringinglow and Stanage.

*Pseudochlamys patella* Clap. et Lachm. A curious form with very delicate flexible test. Occurs on dripping rocks amongst moss at Slippery Stones (Derwent). Mid-winter.

*Centropyxis aculeata* (Ehrenb.) Stein. Common amongst sphagnum and in pools.

Var. *ecornis* (Ehrenb.) Leidy, generally with the above.

*Diffugia pyriformis* Perty. Common in pools, troughs, and amongst aquatic vegetation. Very variable.

Var. *compressa* (Carter) Leidy. Fairly common in similar situations. Stanage, Froggatt, etc.



*Diffugia acuminata* Ehrenb. Common in sediment. Test often consists entirely of diatom frustules (= *D. bacillarium* Perty. Ecclesall Woods. Froggatt, etc.

*Diffugia globulosa* Dujardin. Common. Ecclesall Woods, Ringinglow, etc.

*Diffugia urceolata* Carter. Not common. Sediment of water-trough, Froggatt.

*Diffugia constricta* (Ehrenb) Leidy. Common in pools.

*Lecquereusia spiralis* (Ehrenb) Schlumb. A form with an apparently coiled shell. Generally common. Stanage, Froggatt, Ringinglow. Occasionally the test consists of angular sand grains. (Ecclesall Woods).

*Nebela collaris* (Ehrenb) Leidy. A common form in Sphagnum. Froggatt, Ringinglow, etc.

*Nebela flabellulum* Leidy. Less common, but in similar situations. Froggatt.

*Quadrula symmetrica* Schultz. Common in pools. Froggatt, Stanage, etc.

*Quadrula irregularis* Archer. Amongst mossy growth on water trough. Ecclesall.

*Cochliopodium bilimbosum* (Auerb) Leidy. Occurs associated with the last form at Ecclesall.

#### Family EUGLYPHINA.

*Euglypha alveolata* Dujardin. A common form and widely distributed. Both spined and unspined forms occur in most situations.

*Euglypha ciliata* (Ehrenb) Leidy. Also common in sediment and amongst aquatic plants. Ringinglow, Froggatt, Stanage.

*Assulina semimulum* (Ehrenb). A few empty tests amongst Sphagnum. Ringinglow and Burbage.

*Cyphoderia ampulla* (Ehrenb) Leidy. Common and widely distributed in sediment and amongst vegetation in pools. Ringinglow, Burbage, Ecclesall Woods, etc.

*Sphenoderia lenta* Schlumb. A few empty tests amongst Sphagnum. Stanage.

*Trinema enchelys* (Ehrenb) Leidy. One of the most widely dispersed forms, very variable in size.

*Pamphagus mutabilis* Bailey. Many associated together amongst floating Alga. Burbage. A form with very delicate flexible test.

? *Pamphagus curvus* Leidy. Several individuals associated with the above appear to correspond to this species.

Family AMPHISTOMINA.

*Diplophrys archeri* Barker. A few individuals amongst the mossy growth on the outside of a water-trough. Ecclesall.

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## BEETLES OF LANCASHIRE AND CHESHIRE.\*

E. G. BAYFORD, F.E.S.

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It is safe to say that no Coleopterist in the North of England can afford to be without this list for purposes of comparison and reference, or to guide him in his studies, whether or not it be his fortune to visit any of the localities named in it. The total number of species recorded for the two counties is 1486. That this is very much below the actual number of species which go to make up their beetle fauna is obvious, and Mr. Sharp himself apparently recognises this, for he admits in his introductory remarks that 'nearly the whole of Lancashire, north of the Ribble, the mountainous districts in the east of that county, and the whole of South and East Cheshire are still virtually unexplored, and probably, especially in the upland districts, maintain a fauna only very partially represented in the median and western plain.' Elsewhere, however, he apparently overlooks this very obvious explanation, and attributes this paucity to be due to the geographical position of Lancashire and Cheshire. We cannot avoid thinking that the absence from both counties of regular systematic work, such as has been organised and directed in Yorkshire by the Yorkshire Naturalists' Union, is more likely to be the true explanation.

The division of each county into suitable areas, and making an excursion into some part of each every year, with the express purpose of recording its entomological fauna, may well be taken up by the Lancashire and Cheshire Entomological Society. So far as the beetle fauna is concerned, we should anticipate an addition of from 250 to 300 species. When some such plan as this has been tried and has failed, it may then be politic to explain poor results by a reference to geographical position.

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\* 'The Coleoptera of Lancashire and Cheshire;' by W. E. Sharp, F.E.S. St. Albans, 1908, 76pp.

Mr. Sharp pays a well-deserved tribute to the self-denying zeal of the working-men naturalists, who did such splendid work in the first half of last century. Unfortunately, these early naturalists had not realised how important the study of distribution would become. Consequently for the purposes of a list, their collections, if still in existence, furnish little or no assistance. Coleopterists are rarely numerous in any county, but Lancashire and Cheshire appear to have had less than the average number. We demur to the inclusion of Samuel Gibson, of Hebden Bridge, who by residence and by the collecting he did around Huddersfield, Halifax and Hebden Bridge, may, in fairness be claimed by Yorkshire Coleopterists as one of themselves. On the other hand, we miss the name of Rev. H. Higgins, who first discovered *Cymindis vaporariorum* L. in Lancashire; and of T. Blackburn of Bowdon. We find that Mr. Sharp has omitted a number of records of species which appeared in the older lists, e.g., Mr. Gregson recorded *Blethisa multipunctata* L., from Crosby, *Pelophila borealis* Payk. from Bromborough, and *Pelobius tardus* Herbst. from Rufford; and Dr. Ellis recorded *Platynaspis luteorubra* Goeze. from Hightown.

An important omission is that of *Mordella fasciata* F., a specimen of which taken by Rev. H. H. Higgins at Rainhill was stated by Dr. Ellis in 1886 to be then in the Derby Museum, Liverpool. This discounts considerably Mr. Sharp's remarks on the genera *Mordellistena* and *Mordella*.

On the contrary, we are pleased to see that Mr. Sharp has re-instated *Lamproyris noctiluca* L. on the authority of three Coleopterists and his own. It was first recorded by Mr. Gregson 'in plenty on the clay banks beyond New Ferry,' but despite this definite record, Dr. Ellis omitted it from his list, for the insufficient reason that he himself had not met with it. Notwithstanding the fourfold confirmation, Mr. Sharp makes no mention of this early record.

Another point which we should have liked Mr. Sharp to have settled once for all is the occurrence of *Helophorus multisanti* Rye. He merely says 'Fowler records this species as taken commonly at Liverpool by Crotch, but it is otherwise unrecorded from the district.' This, however, is not the case. Dr. Ellis records 'one specimen from the Hightown shore, May 1882.' F. Archer says of it: 'abundant in the ditches Altcar rifle ground. This is also new, being distinct from *H. dorsalis* Marsh.' The latter species he does not record, and

yet in the face of his definite statement as to the distinction between *H. dorsalis* Muls. [= *H. mulsanti* Rye.] and *H. dorsalis* Marsh, Dr. Ellis, without the slightest justification, transferred Archer's record of the former species to the latter. Now, there may be good reasons for disregarding Archer's definite statement and the records of Crotch and Dr. Ellis, with which must go the authority of E. C. Rye, who presumably satisfied himself that Archer and Crotch had rightly diagnosed the species. If such there be, we submit that Mr. Sharp should have given them, so that we might have considered them for ourselves, and accepted or rejected the conclusion to which he appears to have come. It may be added that Mr. Sharp omits *H. dorsalis* Marsh for which the only record is the improper one of Dr. Ellis, referred to above.

Despite what we have said, this list marks a great advance on the restricted list of Dr. Ellis, which only enumerated some 850 species, and Mr. Sharp deserves our thanks for its compilation. If our suggestion as to organised excursions, etc., be adopted, and an accession of species be the result, we shall look to him to furnish us with a fuller and more complete list which will be exhaustive in its inclusion of previously recorded species and at the same time scientifically critical as to their right to a place in the list.

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**Waterloo Museum, Liverpool.** Complete History of the Echalaz Collection. By **Lieut. Col. Echalaz.** Croydon. 325 pp.

This excellent and well-printed volume is a detailed description of the collection of British Birds, etc., recently presented to the Waterloo Museum by Lieut-Col. Echalaz. Printed in large type, and on thick paper, the first impression one gets is that it puts the publications of our national museum at South Kensington in the shade! There are seventy cases in the collection, and these are described to some length. In each instance, particulars of the capture of the bird are given, with other general information, admittedly extracted from Saunders' 'Manual of British Birds.' Most of the specimens are the victims of the gallant colonel's gun, but with regard to the Great Northern Diver, there is an exception to this rule. With this wary bird the Colonel had not his characteristic luck—one shot fell about an inch too short of the bird, and he believes he wounded another. The colonel appears to have always been a sportsman. At the age of twelve he was allowed a single-barrelled gun, and at fourteen, he shot his first hare, and first pheasant. There is a portrait of the Colonel as frontispiece, and his life-history is given in the first chapter. In this he deplores the fact that he was never in active service, but he trusts that, as he had faced a wounded tiger, he would have acquitted himself both as a soldier and an Englishman, had he been called upon to face the bullets of any enemy. Personally, we feel rather glad, for his sake, that he was not called upon to 'face bullets'; we should not imagine it at all a pleasant proceeding. There are several plates from photographs of the cases, many of which are good; but some, we hope, hardly do justice to the specimens.

Naturalist,

## FIELD NOTES.

### *MAMMALS and BIRDS.*

**Otter and Kingfisher at Horncastle.**—In the Canal which runs through the town of Horncastle, an Otter has recently been seen disporting itself at the end of a stone-mason's yard, and within a few feet of his work-shop. At the writer's oft-repeated request, it was not disturbed, and occasionally lay on the bank in full view. At the same place a Kingfisher (now also undisturbed), has been frequently seen during the last two years, diving for food. Can there be any connection between these two incidents? The mason says that there are shoals of small roach or dace about this part of the canal.\* On one occasion an unfortunate Kingfisher rose from his dive with such impetus, that he struck against the brick wall bordering the water, and was killed. — REV. J. CONWAY WALTER, Langton Rectory, Horncastle, December 16th, 1908.

**A Birdland Tragedy.**—Early in December last, a painter brought me the mummified body of a Swift, which he had found in a hole under a spout. Apparently the bird had somehow or other managed to become entangled in a piece of cord, and hang itself. I sent the bird over to a meeting of the Bradford Naturalists' Club, and they, with their usual thoroughness, held a post-mortem examination, and what appeared to be a lot of string, turned out to be a portion of a lady's veil. This had been tightly twisted round and round, and had gathered an external coating of dirt and soot, which gave it the exact appearance of thick string. Attached to the veil there were three or four inches of ordinary garden wire netting.

By a method of deduction we get a probability something like the following :—A veil blew from a lady's hat, and caught in some wire netting, and waving in the breeze, took a Swift's fancy for nesting material. All might have gone well if the piece of wire had not become fixed near to the entrance of the nesting hole. A few struggles with it caused the veil to twist round the bird's neck and foot. Then a series of struggles to get free must have resulted in the bird putting such an amount of twist into the veil, that it became tightly drawn,

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\* The abundance of food has no doubt attracted both the Otter and Kingfisher.—EDS.

and the bird died of exhaustion in the hole. It is noteworthy that the bird in its struggles to get free must always have



turned one way. thus giving the veil such a "hard twist," that it resembled string.

After the post-mortem, the body was decently interred in the Cartwright Museum, Bradford.—R. FORTUNE, Harrogate.

**Honey Buzzard in Northumberland.**—Whilst rambling in Whittle Dene, Ovingham-on-Tyne, with a friend on Sept. 25th, 1908, we found a large bird, still alive, but in a feeble condition. It died after being removed to our house. After skinning and setting it up, it was identified by the Hancock Museum authorities at Newcastle, as a Honey Buzzard. The bird had evidently been fasting, for it was very thin, and hardly weighed much more than a pound.—DOUGLAS CLAGUE, Newcastle-on-Tyne.

**ORTHOPTERA.**

**A Cockroach new to Yorkshire.**—Last August, Mr. Malone kindly gave me a large Cockroach from the Bradford market, which was altogether new to me. I sent it on to Mr. R. Shelford, of the Oxford Museum, who kindly named it *Nyctibora brunnea* Thunb. It is a South American species. Of course it is 'only an introduction,' but we must bear in mind that all our big cockroaches have been introduced with commerce. Some of them, however, have come to stay; have found congenial habitations, and have multiplied enormously. It is therefore of interest and importance to know the time of their coming.—J. W. CARTER, Bradford.

***Leucophœa surinamensis* Linn. at Bradford.**—In 1906 I had a specimen of this Cockroach brought in from the Bradford market. During 1907-8 Mr. F. Rhodes gave me several from a hot-house in Lister Park, Manningham, where it has become firmly established.—J. W. CARTER, Bradford.

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**MOLLUSCA.**

***Vertigo alpestris* at Ingleton.**—The members of the Leeds Branch of the Conchological Society held a joint ramble with the members of the Manchester Branch, at Ingleton, on the 12th September, 1908. Thirty-six species of landshells, and nine slugs were recorded during the day. Mr. J. W. Taylor was fortunate in adding a second authentic locality for *Vertigo alpestris*. This species, and *Vertigo minutissima* are the most uncommon of the genus that are known to occur in Yorkshire. It is interesting to add another locality to the very few already known for these rare species. It is perhaps as well to state that it occurred under stones on the top of a wall in Beesley Glen. This appears to be the general habitat for this species, as it is found under similar conditions in other localities. It was first recorded from a garden wall at Bingley, by Mr. J. A. Hargreaves in 1887.—F. BOOTH.

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**BOTANY.**

**The Hybrid Oak in Yorkshire and other parts of Britain.**—There appears to be no definite record of the occurrence of the Hybrid Oak (*Quercus Robur* × *sessiliflora*) in Britain. During the summer of 1908, I found it in the following

Watsonian vice-counties :—west Kent, Cambridge, Chester, west Lancaster, south-west Yorkshire, and Westmorland with North Lancashire. Dr. W. G. Smith and Mr. A. G. Tansley gathered some specimens of Oaks in North-East Yorkshire last June, and these were examined by Mr. Tansley and myself : among the specimens were one or two of the Hybrid Oak. Mr. W. M. Rankin has forwarded me specimens, a few of which belong to the Hybrid, from a locality in mid-west Yorkshire. Mr. Tansley also reports to me the finding, in June 1908, of the Hybrid Oak in Hereford and Worcester. Herbarium specimens which I have examined, prove its occurrence also in Sussex, Bedford, Derby, Dumbarton, and Perth. I am very shortly publishing elsewhere an account of the characters, status, and distribution of all the British Oaks.—C. E. Moss, Cambridge.



### **Transactions of the Rochdale Literary and Scientific Society.**

Vol. IX., 1905-1908. 114 + xxxiv. pp.

This record of this Society's work for the last four years is a good one, and contains many useful papers. Perhaps that which will appeal to our readers the most is on 'Fossil Arthropoda and Pisces from Middle Coal Measures of Sparth, Rochdale,' by William A. Parker. In this the author enumerates the various finds made from time to time in the now well-known ironstone nodules in the shales at Sparth Bottoms. The paper is illustrated by representations of the more interesting fossils found. There is a paper on 'Manchester's contribution to the Chemistry of the Nineteenth Century,' by J. H. Brittain; 'Marine Shells: their Variety and Beauty,' by Rev. A. Hann, and 'The Underground Waters of Rochdale and Neighbourhood' (with analyses), by T. Stenhouse. There are also exceedingly useful papers on such subjects as Rochdale Newspapers, the Meteorological Elements of Rochdale, Two Reputed Manor Houses of Rochdale, Inscriptions on Rochdale Gravestones, etc., as well as others of a purely literary character. This Society is obviously doing excellent work in its district, and, in its Transactions are preserved many important communications.

**Animal Romances**, by **Graham Renshaw, M.B., F.Z.S.** London : Sherratt & Hughes. 206 pp., 7/6 net.

Some little time ago in noticing this writer's 'Final Natural History Essays,' we expressed the hope that they might not be 'final.' This hope has been realized, and we can safely say that 'Animal Romances' is even more interesting than its predecessors. It consists of a series of essays, written first-hand from actual studies in the field, in this way shewing a marked contrast between many, very many 'natural history' books that are now being placed upon the market. The present volume deals not so much with the zoology and history of the mammals, as with Dr. Renshaw's previous books, but in the present case the author has attempted to present the animals as actually living and moving before the reader. Dr. Renshaw now deals with elephants, giraffes, hippopotamus, eland, jackals, penguins, etc., etc., and the essays are written in a style and with a literary 'finish' that is quite refreshing. The only fault we have to find with the volume is the increase in the size of its pages, the actual letterpress being the same as in previous volumes, though this may have been done to better accommodate the many excellent plates.



# THE PHYTOPLANKTON OF THE ENGLISH LAKE DISTRICT.

(PLATES V., VI. and VII.).

WM. WEST, F.L.S.,  
AND  
G. S. WEST, M.A., D.Sc., F.L.S.,

## I.—INTRODUCTION.

During an investigation of the British freshwater phytoplankton, material has been collected on several occasions from the various lakes of the English Lake District. These collections were made as part of a general comprehensive scheme for the investigation of the plankton of the British lakes. We have been enabled to carry out this research during the last few years, chiefly by means of several grants from the Government Grant Committee of the Royal Society.\*

The general Alga-flora of the English Lake District is fairly well worked out. The earliest paper of importance was a list of Desmids found in the neighbourhood of Windermere by Bissett,† and this was followed by two papers by A. W. Bennett.‡ We have ourselves explored the greater part of this area very thoroughly for Algæ of all kinds, and have at different times contributed papers dealing either exclusively or partially with the Algæ of the English Lake District.||

The first collections of plankton were made in June 1903, and we had the advantage of beginning this plankton investigation after having previously acquired a very complete knowledge of the general Alga-flora of the bogs, streams, pools, and lake-margins. This has enabled us to thoroughly appreciate the differences between the phytoplankton and the general Alga-flora, and to endeavour to find out something concerning the existing relationships between them.

Considering the size of some of the English lakes, they are situated in a very compact area, the whole of which is incor-

\* A general summary of this work, treated largely from a comparative standpoint, has quite recently been presented to the Royal Society.

† J. P. Bissett, 'List of Desmidiæ found in gatherings made in the neighbourhood of Lake Windermere during 1883,' *Journ. Roy. Micr. Soc.* 1884.

‡ A. W. Bennett, 'Freshwater Algæ of the English Lake District, etc.,' *Journ. Roy. Micr. Soc.*, 1886; 'Freshwater Algæ of the English Lake District, II,' *ibid.* 1888.

|| W. West, 'Algæ of the English Lake District,' *Journ. Roy. Micr. Soc.*, 1892; W. and G. S. West, 'New British Freshwater Algæ,' *ibid.* 1894; W. and G. S. West, 'Notes on Freshwater Algæ, II,' *Journ. Bot.*, XXXVIII., 1900; III., *ibid.* XLI., 1903, etc.

ated within a radius of about 15 miles from a centre, taken at Dunmail Raise (about half-way between Grasmere and Thirlmere). Within this area many high mountains are embraced, four summits being over 3000 feet, and four others exceeding 2900 feet. In all, there are more than forty mountains over 2000 feet in height in this small area.

The lakes are numerous, and ten or twelve of them are moderately large, although rather narrow, Windermere having a length of over ten miles, Ullswater a length of over seven, and Coniston Water a length of over five miles. There are at least a dozen more smaller lakes, no less important than the larger ones from an algological standpoint, and in addition, a considerable number of mountain tarns.

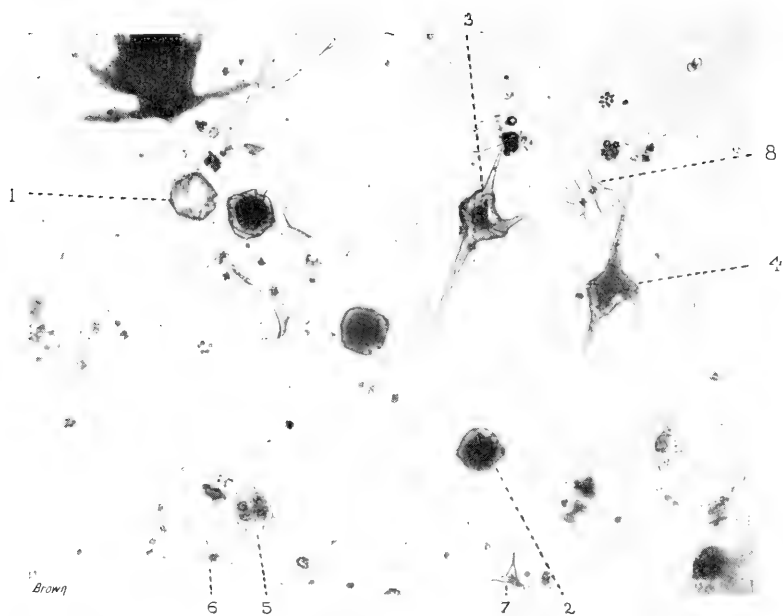
As might be expected in a western mountainous region, the *rainfall* is very heavy, varying from about 50 inches in the outer zone, to about 150 inches in the more central region of the highest mountains. The rainfall at Seathwaite at the upper end of Borrowdale, is the heaviest in the British Islands, and is only approached by that registered in the Cullin Hills in Skye. This heavy rainfall, and the frequent torrential character of it, is no doubt responsible for washing many of the bog species of Algæ into the plankton, and affords an explanation of the presence of certain species in the limnetic region of the lakes.

We have already pointed out the important relationship between the geological character of a district and the constituents of its Alga-flora, more especially of its Desmid-flora.\* The entire Lake District is an Older Palæozoic area, in which a northern outcrop of Ordovician strata is separated from a southern Silurian outcrop by an extensive mass of pre-Devonian igneous material. The *really rich* Alga-floras are all on the Older Palæozoic or Precambrian areas, and the English Lake District possesses a richer Alga-flora than any other part of England, although not quite equal to that of the north-west of Scotland or the west of Ireland. The phytoplankton of the lakes is similarly rich in species, although not so prolific as the limnetic flora of the lakes of north-west Scotland.

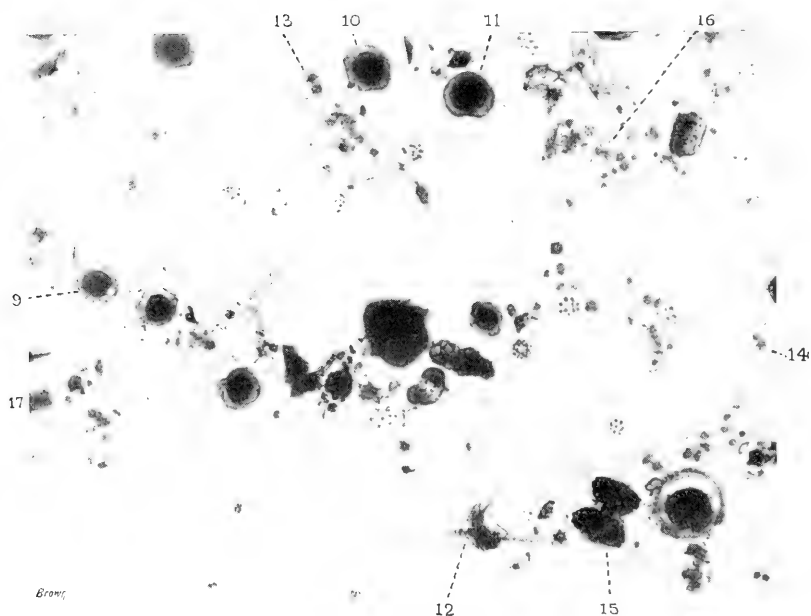
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\* W. and G. S. West, 'Alga-flora of Yorkshire,' 'Trans. Yorks. Nat. Union,' V., 1900-1901, p. 5; G. S. West, 'Treatise on British Freshwater Algæ,' Cambridge, 1904, p. 6; W. and G. S. West, 'A further Contribution to the Freshwater Plankton of the Scottish Locks,' 'Trans. Roy. Soc., Edin.', XLI., Part III., 1905, p. 511.



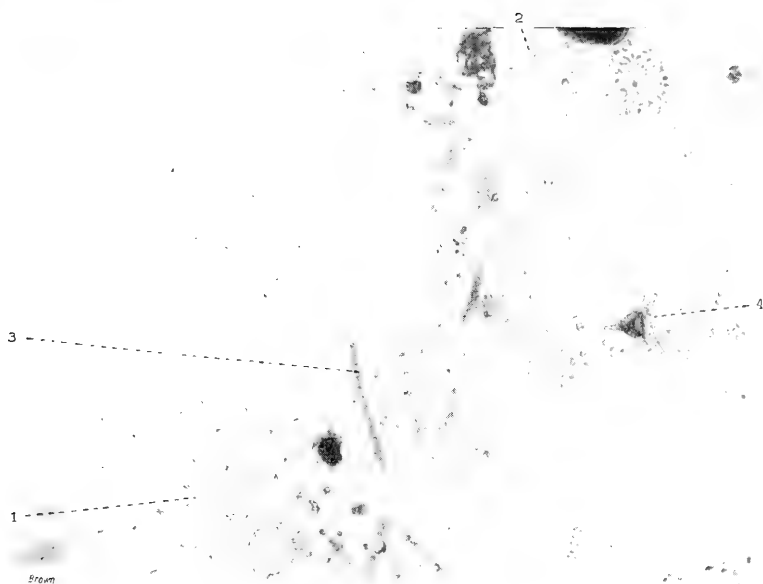


Ennerdale Water (x 100).

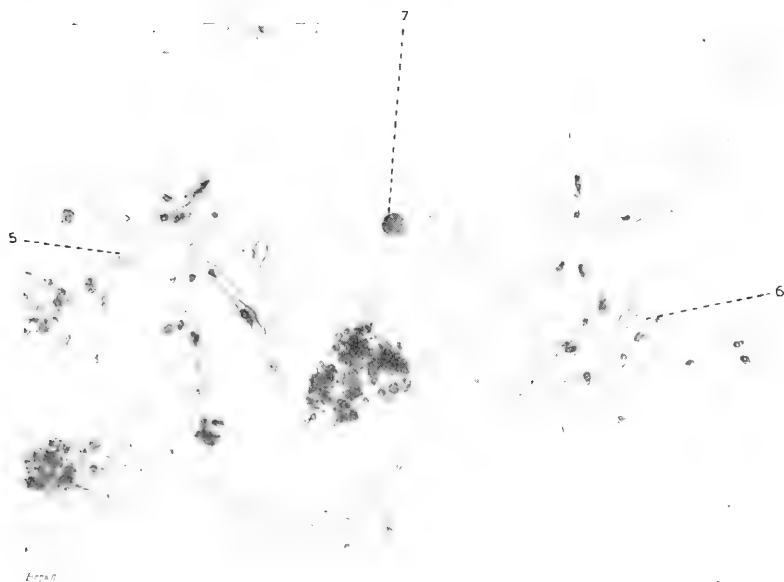


Ennerdale Water (x 100).

FRESHWATER PLANKTON.



**Crummack Water** (x 100).



**Derwent Water** (x 200).

**FRESHWATER PLANKTON.**



In all, eighteen lakes were examined for their phytoplankton, the tow-netting being done by boats wherever they were available. Where boats could not be obtained, the plankton-collections were made either by the tedious process of baling a large volume of water through the nets, or by allowing the water of the outlet to flow through the nets for some time. The nets used were such as we have described before, and consisted of the strongest silk bolting-cloth, with a very close and uniform mesh (170 meshes in a linear inch).

We have quite recently been receiving regular monthly collections from Windermere, Wastwater, and Ennerdale Water, in order to obtain an adequate idea of the periodicity of the various constituents of the phytoplankton of three representative lakes. As yet, only the Windermere collections are complete for twelve months, and a separate section of this paper is devoted to their consideration.

## II.—DETAILED ACCOUNT OF THE LAKES EXAMINED.

GENERAL NOTICE OF THE LAKES INVESTIGATED. The dates are those on which the plankton-collections were made.

1. *Buttermere, Cumberland.* May 1903. Altit. 331 feet. About one and a quarter miles long, by three-eighths of a mile broad. Average depth about 55 feet; maximum depth, 94 feet. The lake is in the midst of mountains, and lies quite away from any village. The plankton contained a few good Desmids and a quantity of *Peridinium Willei*. *Tabellaria fenestrata* was the most conspicuous of the Diatoms, and of the Rotifers, *Notholca longispina* was abundant.

2. *Crummock Water, Cumberland,* May 1903. Altit. 321 feet. About two and a half miles long, by five-eighths of a mile broad. Average depth, 88 feet; maximum depth, 144 feet. The lake is in the vicinity of high mountains, one summit having an altitude of 2791 feet, being distant less than one mile. There are no villages in the vicinity, and therefore little contamination of the water. The plankton collected could be described as a DINOBRYON-PLANKTON. The dominating species was *Dinobryon cylindricum*, and with it was a quantity of *Cælosphaerium Kützingianum*. The only conspicuous Diatom was *Melosira granulata*. Of the Chlorophyceæ, *Ankistrodesmus Pfitzeri* was quite common, a sterile species of *Mougeotia* with very long cells was frequent, and a number of Desmids were of general

occurrence. The most noticeable of the latter were *Cosmarium abbreviatum* var. *planctonicum*, *Xanthidium antilopæum* var. *depauperatum*, *Staurastrum furcigerum* forma *eustephana*, a form of *St. anatinum*, *St. Arctiscon*, and *Spondylosium pulchrum* var. *planum*. A few of the larger Entomostraca were present, and also a few Rotifers, of which *Notholca longispina* and *Polyarthra platyptera* were the most frequent, the latter occurring in considerable quantity.

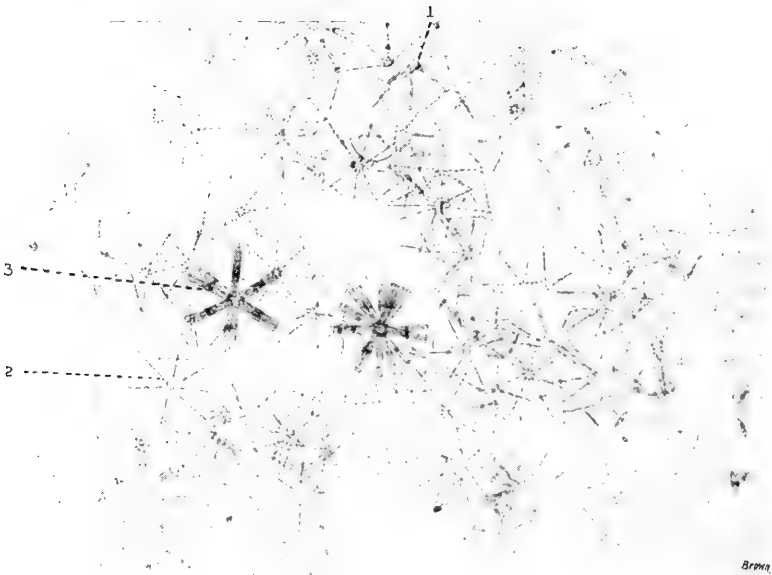
3. *Ennerdale Water, Cumberland.* May 1903. Altit. 369 feet. Two and a half miles in length by three-quarters of a mile broad. Average depth about 62 feet; maximum depth 148 feet. The lake has a somewhat desolate situation, and only two or three houses are near it. It is the most western of the lakes, and lies between mountains which rise on each side to 2000 feet. It has a separate drainage basin, not being connected with any of the other lakes of this area, and the valley above it is strewn with numerous moraines. The plankton was dominated by *Peridinium Willei*, and numerous Desmids. *Ceratium hirundinella* was also common. The smaller species of Desmids were very abundant, the most conspicuous being *Gonatozygon monotænium*, *Staurastrum lunatum* var. *planctonicum*, *St. dejectum*, *St. curvatum*, *St. jaculiferum*, *Arthrodesmus triangularis*, *Cosmarium subarctoum*, and *C. bioculatum*. The most interesting of the larger Desmids were *Cylindrocystis diplospora* var. *major*, *Micrasterias Sol*, *M. pinnatifida*, *Cosmarium connatum*, *Staurastrum furcigerum*, *St. Arctiscon*, *St. longispinum*, and *St. sexangulare*. The Entomostraca were very numerous, and included various Copepods, *Bosmina longirostris*, and an abundance of Nauplii. Many of the dead individuals had been attacked by species of *Saprolegnia*. Only a few Rotifers were present, the two most conspicuous being *Anuræa cochlearis* and *Notholca longispina*.

A few specimens were observed of a solitary species of the genus *Dinobryon* which we have described as new under the name of *D. crenulatum*.

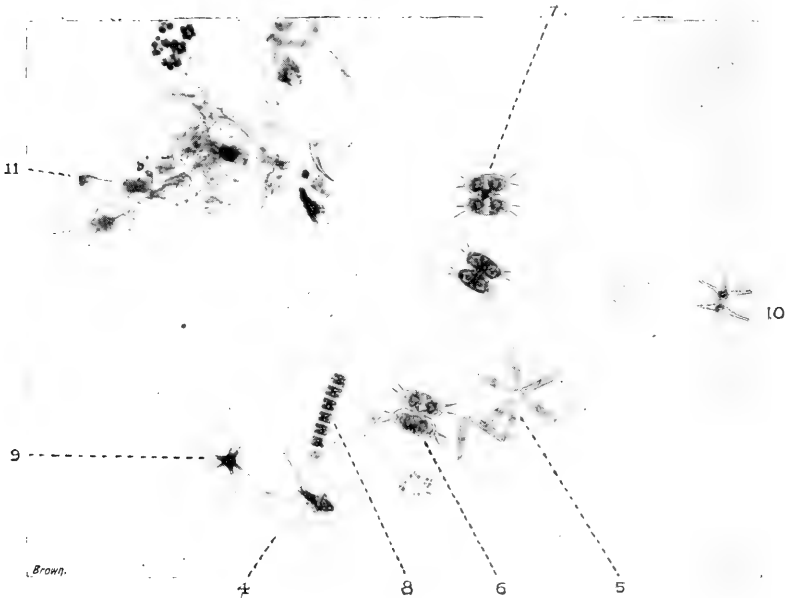
4. *Derwent Water, Cumberland.* June 1903. Altit. 238 feet. About three miles in length by a little over a mile in breadth. Average depth about 18 feet; maximum depth 72 feet. This lake receives the drainage of the Borrowdale mountains, and although the small town of Keswick is not far from its northern shore, there is probably little contamination from







Windermere (June). (x 100).



Windermere (Sept.). (x 100).

FRESHWATER PLANKTON.

that quarter. The June plankton is a DINOBYRON-PLANKTON, consisting for the most part of immense quantities of *Dinobryon cylindricum* var. *divergens*. *Peridinium Willei* was not uncommon. Desmids were very scarce, and few species were represented. Rotifers were few. Quantities of the pollen-grains of Pines were present in the plankton.

5. *Bassenthwaite Water, Cumberland.* May 1903. Altit. 223 feet. About four miles long by three-quarters of a mile wide. Average depth about 18 feet; maximum depth about 70 feet. This lake is in the extreme north-west of the English lake-area, and lies about two miles west from the summit of Skiddaw (3054 feet). There is doubtless a slight contamination of the water from farms and residences in the vicinity of the lake. Diatoms were the dominant feature of the plankton, the most conspicuous species being *Tabellaria flocculosa*, *T. fenestrata*, *Synedra pulchella*, and *Nitzschia palea*. Very few Desmids occurred, *Spondylosium pulchrum* var. *planum* being the most frequent. *Dinobryon cylindricum* var. *divergens* was scarce, as was also *Peridinium Willei*. There were few Rotifers.

6. *Thirlmere, Cumberland.* June 1903. Altit. 553 feet. About three and a quarter miles long by about half a mile broad. In 1894 this lake was first used as the water supply for the City of Manchester, and its level raised 20 feet. It has a maximum depth of about 128 feet, and there is scarcely any possibility of contamination of the water. The June plankton consisted mostly of Crustacea (with an abundance of Nauplii) and Rotifers. *Tabellaria flocculosa* and *T. fenestrata* were both common, and were both in the form of chains. The most interesting member of the phytoplankton was *Rhizosolenia morsa*, some individuals of which had formed resting-spores.

7. *Wast Water, Cumberland.* June 1903. Altit. 204 feet. About three miles long by about half a mile broad. It is the deepest of the English lakes, having an average depth of 135 feet, and a maximum depth of 258 feet. It contains a very large volume of water, which is practically free from all contamination, and rising from its south-eastern shore are the world-famous screes. It receives the drainage from the western side of Scafell (3162 feet) and Scafell Pike (3210 feet), and from the southern slopes of the Steeple, the Pillar, and Kirk Fell. The June plankton contained large numbers of Crustacea and Rotifers. Of the latter, *Polyarthra platyptera* and *Notholca longispina* were most conspicuous. The Desmids were few in

number, but included some particularly fine specimens of *Staurastrum jaculiferum*. *Cocconema gracile* and a few other Diatoms were observed. The most interesting member of the phytoplankton was *Elakatothrix gelatinosa* Wille, this plankton-alga not having been observed from any other lake in the British Islands.

We are receiving periodic collections from this lake, and the August and September collections, 1908, contained quantities of *Elakatothrix*.

8. *Brothers' Water, Westmorland.* September 1906. Altit. 520 feet. A small lake about three-quarters of a mile long by a quarter of a mile broad. Its greatest depth is about 70 feet. The dominating constituents of the September plankton were Desmids and the spiny Flagellate *Mallomonas longiseta*. In fact, the latter was so numerous that the plankton could be correctly termed a MALLOMONAS-PLANKTON. The principal Desmids were *Staurastrum Arctiscon* (very common), a large stout variety of *St. brevispinum*, *X. antilopæum* var. *triquetrum*, and *Cosmarium depressum*. *Ceratium hirundinella* was common, and a few specimens of *C. cornutum* were observed. Large colonies of *Dinobryon cylindricum* var. *divergens* occurred rather sparingly. Many Crustacea and Nauplii were present, and the three Rotifers *Anuræa cochlearis*, *Notholca longispina*, and *Polyarthra platyptera* were equally abundant. Fine specimens of *Acanthocystis chætophora* were frequent in the plankton.

9. *Hayes Water, Westmorland.* September 1906. Altit. 1383 feet. A small mountain lake with rocky shores, about a quarter of a mile long, lying under the western slopes of the High Street Range. It contained a mixed plankton of which *Gymnodinium paradoxum* was the most conspicuous constituent. *Oscillatoria tenuis* and *Tabellaria flocculosa* were both common. There were few Desmids, but *Ankistrodesmus Pfitzeri* was plentiful, mostly in process of formation of autospores. As would be expected, much dark-coloured organic matter was in suspension in the water.

10. *Red Tarn, Westmorland.* May 1903. Altit. 2356 feet. This is a small mountain lake, about a quarter of a mile square, on the eastern side of Helvellyn, and immediately below the summit (3118 feet). The surroundings are rocky, and there is no possible source of contamination. The plankton was mixed in character. *Dinobryon cylindricum* and *Tabellaria flocculosa* were equally common. Of the other Diatoms, *Synedra radians*

and *Cocconema ventricosum* were the most noticeable. Large numbers of small Desmids were present, of which *Cosmarium abbreviatum* var. *planctonicum* was the most abundant, although *Staurastrum denticulatum* and bi- and tri-radiate forms of *St. jaculiferum* were exceedingly common. *Peridinium Willei* was frequent, and a few specimens of *Anuræa cochlearis* were observed.

11. *Ullswater, Westmorland.* May 1903 and September 1906. Altit. 476 feet. About  $7\frac{1}{2}$  miles long by three-quarters of a mile broad. Average depth 83 feet ; maximum depth 205 feet. This is one of the larger lakes, mostly with rocky shores, and its upper end is situated among high mountains. The water is somewhat contaminated by the hamlets of Patterdale and Glenridding, and also by the water running from the Green-side Lead Mines. As a result of this slight contamination, the plankton is great in bulk, but poor in quality for the size and situation of the lake. It is an ASTERIONELLA-PLANKTON both in May and September. In May little else exists besides the enormous quantity of *Asterionella formosa*, only a few specimens of *Tabellaria flocculosa* and *Dinobryon cylindricum* var. *divergens* being observed. In September the great mass of *Asterionella* has amongst it a sprinkling of other Diatoms, a few Desmids, and a considerable quantity of *Dinobryon cylindricum* var. *divergens*. *Tabellaria flocculosa* occurs in long chains and *Tabellaria fenestrata* var. *asterionelloides* is frequent. The Desmids are chiefly *Spondylosium pulchrum* var. *planum*, *Staurastrum brevispinum* (large variety), and *St. cuspidatum* var. *maximum*. *Oocystis lacustris* and *Sphærocystis Schroeteri*, both of which are typical plankton-species of the Protococcoideæ, were not uncommon. *Anuræa cochlearis* was also present.

12. *Hawes Water, Westmorland.* September 1906. Altit. 694 feet. About two and a half miles long by about three-eighths of a mile broad. It is rather an isolated lake, with a maximum depth of 103 feet, and an average depth of about 40 feet. The September plankton was somewhat mixed, but was mostly a *Diatom-plankton*, with a large admixture of *Cælo-sphaerium Kützingerianum*. The Diatoms were chiefly zig-zag chains of *Tabellaria fenestrata*, *Cocconema gracile*, *C. cymbiforme*, and *Synedra Acus*. *Ceratium hirundinella* was common, and sterile filaments of *Mougeotia elegantula* were frequent. A few Desmids were observed, amongst which *Staurastrum jaculiferum* was the most abundant. Others were *St. denticulatum*, *Arthro-*

*desmus crassus*, *Spondylosium pulchrum* var. *planum*, and *Gonatozygon monotænium* var. *pilosellum*. *Anuræa cochlearis* was frequent.

13. *Grasmere, Westmorland.* June and September 1903. Altit. 208 feet. About a mile long by half a mile broad. It has a somewhat rocky margin, and its greatest depth is 180 feet. The water may be slightly contaminated by the village of Grasmere. The September plankton was largely a combined *Diatom* and *Dinobryon*-plankton. The Diatoms consisted almost exclusively of *Asterionella formosa* and *Tabellaria fenestrata* var. *asterionelloides*. The *Dinobryon* was *D. cylindricum* var. *divergens*. *Ceratium hirundinella* was fairly common, and *C. cornutum* and *Peridinium Willei* occurred in small quantity. A few Desmids were fairly general, among which *Xanthidium subhastiferum* var. *Murrayi* and *Staurostrum cuspidatum* var. *maximum* were the most conspicuous. The most noteworthy Desmids were *Cosmarium controversum* and *Micrasterias Mahabuleshwarsensis* var. *Wallichii*, the former being known from North Wales and N.W. Scotland, and the latter only from the plankton of lakes in Sutherland and the Shetland Islands. A sterile species of *Mougeotia* was frequent, and the filaments exhibited a coiling comparable to that observed in several of the Scottish lakes.\* (Fig. 1 c. and d.). Species of *Mougeotia* occur in a living condition in the plankton of very many of the British lakes, throughout the greater part of the year, and the coiling of the filaments undoubtedly shows the development of a limnetic character, due to adaptation of the plants to an existence in the plankton. The coiling of the filament very considerably increases its floating capacity.

Several of the Myxophyceæ were not uncommon, more particularly *Oscillatoria Agardhii*, *Anabæna Lemmermannii*, and *Microcystis stagnalis*. Two *Rhizopods* were observed—*Arcella vulgaris* and a long-spined species of *Acanthocystis*.

The June plankton consisted of a mixture of large quantities of *Dinobryon cylindricum* var. *divergens* and *Peridinium Willei*. Amongst these flagellated organisms were a number of Rotifers, more especially *Hydatina* and *Anuræa cochlearis*.

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\* W. and G. S. West in 'Journ. Linn. Soc. Bot.', XXXV., 1903, p. 524; also in 'Trans. Roy. Soc. of Edin.', XLI., Part III., 1905, pp. 497 and 510.

(To be continued).



Very truly yours  
W. W. Huddleston





## In Memoriam.

WILFRED H. HUDLESTON, F.R.S., F.G.S., etc.

(1828-1909).

(PLATE VIII.).

ANOTHER gap in the group of prominent Yorkshire Geologists occurred on Friday evening, January 29th, when Mr. W. H. Hudleston passed away, after a very brief illness. The day previous, though he was in his eight-first year, he was in his usual health, being remarkably active and energetic for his age.

Mr. Hudleston was born at York, and his early years were devoted to the study of ornithology. Between 1853 and 1860 he travelled extensively in Europe and northern Africa; and at the celebration of the jubilee of the British Ornithologists' Union, held in London a month before his death, he was one of four original members who received a gold medal.

In his boyhood days he was a play-fellow of the late Henry Clifton Sorby, whose death we only recently had to deplore. He was then known as Simpson, his father being Dr. Simpson, of Harrogate. He joined the Geological Society of London in 1867 in the name of Simpson, but a fortnight later changed his name to that more familiar to us.

In the 'seventies he devoted much time to the study of the Yorkshire Secondary Rocks, and his well-known monographs on the Palæontology of Yorkshire Oolites, which appeared in the 'Geological Magazine,' and in the Reports of the Palæontographical Society, are amongst the earliest and best known of his published papers. These at once stamped his reputation as a careful student of fossil forms, and though written so long ago, they are in constant use by workers in these fields to-day.

In the 'seventies' also he was for three years the secretary of the London Geologists' Association, and became its President in 1881. From 1886-1890 he was one of the Secretaries of the Geological Society, and was its President for the years 1892-4. The Wollaston Medal, the highest award of the Geological Society, was bestowed upon him in 1897, and in the following year he was President of Section 'C' of the British Association, at the Bristol Meeting.

Yorkshire geologists particularly regret the departure of a most amiable and able leader of excursions, and on the many occasions upon which he conducted parties around the quarries in the Scarborough district, his value was realized.

In 1888 Mr. Hudleston was the President of the Yorkshire Naturalists' Union, and conducted an excursion to Robin Hood's Bay. At the annual meeting held at Sheffield, he gave his presidential address 'On the Geological History of Iron Ores,' which, oddly enough, was printed in the 'Proceedings of the Geologists' Association' for May 1889.

Mr. Hudleston was the subject of one of the well-known 'Eminent Living Geologists' series, which appeared in the 'Geological Magazine' for 1904. This is accompanied by an excellent portrait and list of his papers up to that date.

On Plate VIII, is a reproduction of the portrait, which appears to be the only one of Hudleston extant.

T. S.

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Vol. II. of **The Book of Nature Study**, edited by Prof. J. B. Farmer (London, Caxton Publishing Co., price 7/6 net), is to hand. It is quite equal to its predecessor, already noticed in these columns. It is well illustrated by reproductions from photographs, diagrams, etc., in the text, and coloured plates. Mr. O. H. Latter has several chapters on Insects, Spiders, Worms, etc.; Dr. Marion J. Newbigin describes the animals and plants of fresh-water and marine aquaria; and Prof. J. Arthur Thompson describes the chief haunts of animals, in a very instructive and entertaining manner. The volume is tastefully bound in green cloth.

**Bird-Hunting through Wild Europe**, by R. B. Lodge. London: Robert Culley. 333 pp., 7/6 net.

The author of this book has been fortunate in visiting several of the most inaccessible parts of Europe, in search of birds and eggs and photographs, all of which he has 'taken,' and his exploits are unblushingly detailed in this volume. And they are very entertaining, though not many writers now-a-days so openly refer to their many achievements amongst rare birds and eggs. Probably, however, Mr. Lodge contributes to various funds for the protection of rare birds and their eggs! Some of his help-mates on his expeditions he forbears to name, at their own request, which we can quite understand. Judging from the 'List of Species met with,' the author has had 'bags' such as many might envy, and his book contains particulars of the travels and hardships and trials in securing these. As with most authors of his kind, there is just a little bit too much of the difficulties he has experienced, which renders a perusal of the book rather irritating at times. That he is an exceptionally well-equipped person for the purpose is apparent from his own concluding paragraph:—'Thus ended our expedition full of interest, in spite of some occasional hardship and discomfort and constant and continual hard work. For bird and egg collecting, combined with photography, in wild countries, is no child's play, and requires absolute fitness in condition and general health, and plenty of enthusiasm for the work, without which it is impossible to stand the strain and bodily and mental fatigue.' The book is illustrated by a large number of fine photographs of birds, nests and eggs, scenery, and occasionally samples of the female population, with which latter we cannot congratulate him on the choice of his subjects, though possibly it was policy to select these for reproduction! In speaking of the nest of the Bittern, we notice he suggests that a photograph has not yet been taken. We would point out, however, that such a photograph, by a well-known Hull ornithologist, was published in a contemporary some little time ago.

## YORKSHIRE NATURALISTS' UNION MEETINGS.

A largely-attended meeting of the VERTEBRATE SECTION of the Yorkshire Naturalists' Union was held in the Leeds Institute, on Saturday, February 13th. When it is considered that the meetings (with a short one of the Wild Birds' Protection Committee) lasted from 2 p.m. to 9-30 p.m., it will be understood that it was necessary to be interesting in order to keep the audience for so long a time.

The President of the Union, Mr. St. Quintin, occupied the chair during the afternoon meeting, and Mr. R. Fortune, President of the Vertebrate Section, for the remainder of the time.

For the Wild Birds' Protection Committee, it was reported that watchers had been arranged for at Spurn and Hornsea Mere, and several interesting letters were read from last season's watchers, etc.

Dr. E. S. Steward, of Harrogate, read an extremely interesting paper upon his experiences during a bird-nesting expedition into south Spain, making many of his hearers long to have the same opportunities of studying numbers of our rarer British birds, where they are found nesting in abundance.

Mr. E. E. Gregory followed with a paper upon 'The Pleistocene Vertebrate Remains of the West Riding.' This, too, was full of interest, especially to the members of the new Mammalia, etc., Committee, affording a splendid guide to their future investigations in this direction. It was illustrated by specimens found in several Yorkshire caves. After an interval for tea, Prof. Patten gave a short account of 'Four hours' continuous observations of the feeding habits of Richardson's Skua.' The observations were made in Dublin Bay, and the account of how the Skua procures his food, by preying upon the gulls and terns, was made especially interesting through being illustrated by lantern slides from Prof. Patten's sketches, made on the spot.

Mr. Whitaker's notes on 'British Bats' were profusely illustrated by lantern slides. Members were particularly pleased to hear Mr. Whitaker, who is our recognised Yorkshire authority upon these mammals. The lecture was enlivened by some very amusing anecdotes.

Mr. Oxley Grabham then gave a short and very racy lecturette upon some of the birds of the Yorkshire Coast, etc., illustrated by a fine series of lantern slides. The account of Spurn and its bird life, beautifully illustrated as it was, gave a splendid idea of the locality, and of the work done there by the Yorkshire Naturalists' Union Birds' Protection Committee. Mr. Grabham showed some charming slides of White Hedgehogs, which he obtained from the neighbourhood of Pickering, stating that there appears to be a strain of albinos in the district.

Messrs. Jasper Atkinson and Wm. Hewett showed a fine series of slides, chiefly bird studies, but as the time was getting late, they were put through the lantern, accompanied by very few remarks.

Several other lots of slides were not exhibited, owing to want of time.

At the beginning of the meeting, Mr. W. Wilson exhibited a White Carrion Crow, particulars of which will duly appear in 'The Naturalist.' The bird presented a very weather-worn appearance, the long tail and flight feathers being much worn and frayed.

Votes of thanks to the Chairman, and to all contributing lectures and slides, brought a most interesting meeting to a close.

On the same date, the YORKSHIRE MARINE BIOLOGY COMMITTEE, in conjunction with the Leeds Conchological Club, had a meeting. Prof. Walter Garstang, M.A., D.Sc., of the Leeds University, as Chairman of the Section, gave an interesting address. After referring to the able work of his predecessor, the late Dr. H. C. Sorby he described the methods of work of such a Committee by which he thought good results might be achieved. He also dwelt upon the importance of recording every obser-

vation, no matter how unimportant or minute it may appear. He gave instances where valuable observations, made by ardent field naturalists of the working-man type, were lost to science, through not being recorded. He thought by careful attention to every little detail in recording matter or observation, much might be added and saved for reference in the future.

Preceding Dr. Garstang, Mr. J. W. Taylor addressed the members of the Leeds Conchological Club on the physiology, morphology and distribution of *Hygromia fusca* and *H. granulata*. Further suggestions and remarks from Mr. Arnold T. Watson, F.L.S., of Sheffield, Rev. F. H. Woods, B.D., Driffield, Mr. S. Lister Petty, Ulverstone, Mr. T. Sheppard, F.G.S., Hull, and Mr. W. Denison Roebuck, F.L.S., Leeds, with a vote of thanks to the two lecturers, brought a very profitable and enjoyable meeting to an end.—F. B.

## REVIEWS AND BOOK NOTICES.

### Lincolnshire Naturalists' Union Transactions, 1907.\*

It is said that all things come to those who wait. The members of the Lincolnshire Naturalists' Union have waited patiently for the Transactions, 1907, and have, at last, received them. One feels afraid to write what one thinks about the present part. As in the previous issues, a very important feature is the excellent lists of County Flora and Fauna. Miss S. C. Stow contributes a list of 'Lincolnshire Galled-plants'; Mr. G. W. Mason a list of Lincolnshire Moths (Spingies and Bombyces) under the title 'The Lepidoptera of Lincolnshire, Part 1.' It is somewhat difficult to understand this title when we remember that in the Transactions for 1906, Mr. Mason contributed a list of 'Lincolnshire Butterflies.' Have butterflies ceased to be considered Lepidoptera in Lincolnshire, or is it intended to publish a new list as a subsequent part? Some of the records in Mr. Mason's list are of great interest, particularly the Oleander Hawk Moth, taken at South Somercoates, and the Reed Tussock Moth, taken by Mr. F. Arnold Lees, near Market Rasen in 1878. The Rev. Thornley and Dr. W. Wallace contribute a remarkably good list of 'Lincolnshire Coleoptera' (Geodephaga), and there are other papers (including the President's address on 'The Pygmy Flint Age in Lincs.') and notes.

It is a very great pity that such valuable contributions as some of them are, should not have been published with much greater care. To be as mild as possible I do not hesitate to say that this issue of the Transactions is not creditable to anyone; errors and misprints are by no means uncommon, in fact, the latter are very abundant; no rule seems to have been recognised in the use of italics, and capital letters are used where small letters should be, and small letters where capitals should be. In one paragraph of 13½ lines on page 208, some eighteen corrections are required; page 207 is not much better. I certainly did not know before that a Rhynchonella was a Lamellibranch, which is the only inference to be drawn from the sentence—'Rhynchonella and other Lamellibranchs are abundant.' On page 209 is a plant name certainly new to me, and, I believe, new to science, to wit—'Alchemilla vulgaris'; several other misprints appear on this page. On page 212 '*Cochlearia*' stands for '*Cochlearia*', and '*Lyeopus*' for '*Lycopus*', and on the next page '*Lychnis flos-cuculi*' set out as '*Lychnis flos-cuculi*'; but what is most conspicuous on this page is the use of more than one and the same fount of type for the grand array of initials. By the way, is not the adopted system of recording very superficial? I believe that frequently the recorder sits in the brake with surface-soil map on the knee, and notes down the various plants growing on the roadside, the conveyance often travelling seven miles an hour.

The pointing in many cases is very unsatisfactory, and makes some of the passages look sheer nonsense. Three examples may be given (two over pointed, and the other without points):—

---

\* Louth, pp. 219-271.

'A series of variegated clays, with layers of sand, shale, and limestone, partly marine and partly fluviatile; the former, with ostreas, at the top, and the latter at the base with paludinas and other fresh-water shells.'

'The Cornbrash, a coarse rubbly limestone, with sandy layers, which was deposited in a shallow sea.'

'Mr. T. S. Bavin has presented a series of specimens from a bore made to locate coal in which the Keuper is found to be at the West of the County 850 feet in thickness.'

In a professedly scientific publication, it is somewhat surprising to find the following passage (which must surely have been misplaced, being intended for one of those famed penny twaddlers)—'Well may we sing with Robert Louis Stevenson in his *Garland of Verse*—

"The world is so full of a number of things

I am sure we should all be as happy as kings."

We had a right royal welcome at Grantham. The day however [!] was much enjoyed.'

\* The object of the Union is presumably expressed, though badly, in the following sentence appearing in the report of the 'Field Meetings':—'The meetings are of such value as to ob' in a great amount of information for the County lists for publica'

\* In the copy before " illustrating 'the junction of the Foss Dyke and the Tre' duplicated, one plate facing page 163, the other " ts have been made, unsuccessfully, to " the result being that " en opened, it

" , there is nothing to " present part  
" middle of 1908, though a de " sheet indicates  
" rate, it was published in " The address of John  
" ueaux which is reprinted, " we think, from the Union's  
Transactions for 1895, has " shew that its author has been dead  
for some years.

The above de " the list of errors, misprints, and other faults, but they are " shew the necessity of someone taking a few lessons  
re " , before the next issue of Transactions, and thereby  
" scientific work being more creditably published.

LINDUM.

Part VII. of T. C. and E. C. Jack's '**Wild Beasts of the World**' (1/- net), deals with the Bears, Sea-Lions, Walrus, Seals, Hedgehogs, Voles, etc., and is illustrated with the usual finely-coloured plates. Speaking of Walrus tusks, we notice the author (Mr. F. Finn), states that they are largely used for making artificial teeth. That was certainly the case when the natural history books of years ago were written, but artificial teeth of this material are difficult to get now-a-days. We have been trying to get such a set for a long time, but so far without success!

The Vertebrate Section of the Yorkshire Naturalists' Union has reprinted its Report for 1908, in advance. It contains excellent summaries of work carried on in the three Ridings, written by Messrs. R. Fortune, E. W. Wade, and T. H. Nelson, as well as particulars of the work of the Wild Birds' and Eggs' Protection Committee.

**The Writers' and Artists' Year Book**, 1909 (A. and C. Black, 1/-), is indispensable to those who add to their income by writing. It gives a classified list of the various publications, their rates of payment for MSS., etc. There is a complete list of such journals; lists of publishers, agents, etc. Some useful advice is given as to the preparation of MSS.; correction of proofs, etc. We notice that 'The Naturalist' does not appear under 'Science and Natural History' in the Classified Index on page 117, though it appears in its place amongst 'Journals and Magazines,' on page 42.

## NORTHERN NEWS.

According to the 'Pall Mall Gazette' a roach of 3 lb. has been caught in the Dove and Dearne Canal, at Elsecar, Yorks.

We have heard of about 'making a noise like a turnip,' but a contemporary, in the heading to a paragraph, records that a 'Privet hedge barked!'

An excellent portrait of a past President of the Yorkshire Naturalists' Union, Sir Ralph Payne Gallwey, Bart., appears in 'The Shooting Times' for January 16th, 1909.

It is not often the 'Yorkshire Weekly Post' is hoaxed, but the following extracts from a report of a meeting of a Junior Field Naturalists' Club are interesting:—'Mr. W. J. W. Slowe, B.E.N.A., gave a lucid description of the finding of *Balaena mysticetus* in the Hornsea Mere, a specimen of which he passed round for examination. Mr. H. Donaldson reported an excursion to Broomfleet, and exhibited a fossil sponge which he had procured from the Laurentian deposit there. Mr. A. J. Moore, M.C.S., read an interesting paper on "Some Local Freshwater Mollusca." The best collecting ground in the Hull district is Sutton Drain. In this drain *Ostrea edulis*, *Aguila chrysaetus*, can be procured, also the interesting species, *mephitis mephitica*.'

The Leeds Naturalists' Club and Scientific Association celebrated the Darwin Centenary at its meeting on the 15th February. Mr. Harold Wager, F.R.S., gave an address on 'Charles Darwin.' Mr. Wager exhibited the Darwin-Wallace medal, while the President of the Club, Mr. W. Denison Roebuck, F.L.S., exhibited a lithograph facsimile of the illuminated address which the Yorkshire Naturalists presented (by deputation visiting Down) to Mr. Darwin in 1880, in celebration of the 'Coming of Age' of the 'Origin of Species,' also the original letter from Mr. Darwin, acknowledging the compliment. Afterwards a resolution was adopted, congratulating Dr. Alfred Russel Wallace on his living to see the fiftieth anniversary of the reading of his and Mr. Darwin's papers to the Linnean Society.

The following will be the presidents at the meeting of the British Association at Winnipeg from August 25th to September 1st:—*President*—Professor Sir J. J. Thomson, F.R.S.; *Sectional Presidents*—A (Mathematical and Physical Science)—Professor E. Rutherford, F.R.S.; B (Chemistry)—Professor H. E. Armstrong, F.R.S.; C (Geology)—Dr. A. Smith Woodward, F.R.S.; D (Zoology)—Dr. A. E. Shipley, F.R.S.; E (Geography)—Colonel Sir Duncan A. Johnston, K.C.M.G.; F (Economic Science and Statistics)—Professor S. J. Chapman; G (Engineering)—Sir William H. White, K.C.B., F.R.S.; H (Anthropology)—Professor J. L. Myres; I (Physiology)—Professor E. H. Starling, F.R.S.; K (Botany)—Lieut.-Colonel D. Prain, F.R.S.; L (Educational Science)—Rev. Dr. H. B. Gray; and Sub-Section (Agriculture)—Major P. G. Craigie (chairman).

Mr. Hans Schlesch, who has frequently favoured the Hull Museum with mollusca, has now presented to that institution the whole of his extensive collection of Land, Fresh-water, and Marine Shells. This collection is well known for its completeness, and for the many type specimens it contains. Mr. Schlesch has been a most enthusiastic collector, having visited many different countries to obtain specimens, and on giving up his hobby he has decided to favour the Hull Museum with the result of his life's work. The collection contains specimens from France, Germany, Russia, Denmark, and other parts of Europe; China, Japan, India, the Philippines, New Guinea, Australia, the United States, etc. Large cases containing many thousand specimens have already been received, and the remainder is on the way. He has also presented his library of works bearing upon the specimens in the collection.

# THE NATURALIST.

A MONTHLY ILLUSTRATED JOURNAL OF  
NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY

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AND

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WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF

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RILEY FORTUNE, F.Z.S.

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All communications should be addressed to the Hon. Secretary,  
T. SHEPPARD, F.G.S., The Museum, Hull.



## NOTES AND COMMENTS.

### IMPORTANT WORK ON DIATOMS.\*

The completion of this great work, which has been appearing in parts throughout the past eleven years, will be hailed with pleasure by all students of the Diatomaceæ. Though expressly intended to deal with those forms that are found on all the coasts of France, it will be found to contain most, if not all of the species of the North Sea and English Channel, and is hence equally valuable to English students. The plates are certainly among the finest drawings of these beautiful microscopic Algæ that have ever been published. Specially worthy of notice are the discoid forms of *Actinocyclus*, *Coscinodiscus* and *Eupodiscus*, and the wealth of detail in such species as the *Naviculas* of the *Diploneis* section.

### EVOLUTION OF DIATOMS.

M. Peragallo's views on the evolution of the Diatoms are set forth in a sort of postscript to the preface accompanying the issue of the final part, and are in some respects both novel and interesting. He holds that the earliest forms of diatoms were of the kind he denominates 'Centriques' (corresponding to Van Heurck's 'Crypto-Raphideæ'), and comprising all forms of circular or angular outline, and those having spines or other processes, and that these descend directly from animal forms, either from the Radiolariæ, or in part from the Peridineæ.

### PLANKTON.

The 'Centriques' are those species that we find to-day floating on the ocean in what is known as the 'Plankton' and are distinguished from the 'Pennées' (Peragallo's other division) not only by their form arranged at about equal distances around a centre, and by the absence of a raphe, but also by their reproductive method, which is by the generation of spores, whereas the 'Pennées' reproduce their kind by conjugation. The author describes how the free-floating, but individually motionless 'Centriques' developed in the 'Pennées' to a naviculoid or boat-shaped form with a raphe or longitudinal slit which is now generally acknowledged to be in some way the organ of the mysterious power of motion of diatoms. This division constitutes Van Heurck's 'Raphideæ.'

---

\* 'Diatomées Marines de France,' by M.M. H. et M. Peragallo. J. Tempère, Grez-sur-Loing (S-et-M) France. 560 pp., 139 plates, 2187 fig., 150 francs.

## DEGRADED DIATOMS.

Finally he looks on the 'Pseudo-Raphideæ' as a sort of degraded forms that have adopted a mode of life limited by their growing attached to Algæ, and consequently have lost their raphe by disuse, and with it their power of movement, the median blank space indicating the position formerly occupied by the raphe. Of course this theory involves the transference of the *Nitzschias* (whose motions are among the liveliest) along with the *Surirellas* and *Epithemias* from the Pseudo-Raphideæ to the Raphideæ. There is very much to be said for this view. It is certain that the most ancient fossil deposits, such as Richmond, Virginia, and Oamaru, New Zealand, consist almost entirely of the discoid forms, while in our modern seas and rivers, the Naviculoid forms constitute the great majority.

## ORIGIN OF DIATOMS.

It is questionable whether M. Peragallo will find many who agree with him as to the animal origin of diatoms, while admitting that now they belong to the vegetable kingdom; but this is a difficulty which may probably disappear with further knowledge of these lowly forms of life, which may be said to belong in one sense or another to either kingdom. We regret to be unable to extend the great praise due to the artist for the plates to the printer or proof-reader. The list of corrigenda is a long one, and does not comprise all that there should be.

R. H. P.

## THE DONCASTER MUSEUM.

At the request of the Doncaster Corporation, the Curator of the Hull Museums recently prepared a 'Report on the Proposed Museum at Doncaster,' which has been printed and discussed by the Doncaster Town Council. In it Mr. Sheppard draws attention to the smallness of the space available in the few rooms at Beechfield, which it was proposed to set apart for museum purposes, and urged that the whole of the ground floor should be available. Suggestions were also made as to the scope of the proposed Museum, dealing principally with the desirability of keeping it *local* in character. It is pleasing to find that practically the whole of the recommendations have been adopted by the Doncaster Corporation, and consequently that town will shortly have its permanent public Museum.

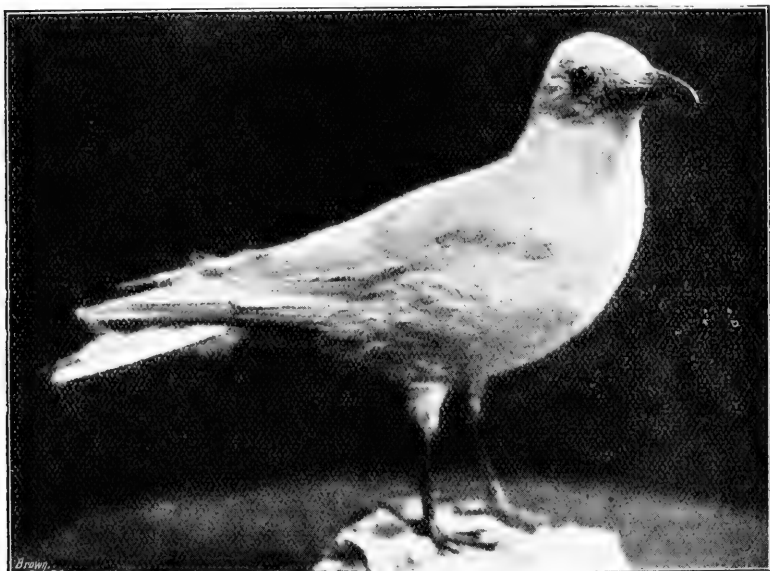
## ALBINO CARRION CROW IN YORKSHIRE.

WALTER WILSON.

THIS was reported in 'The Naturalist' for October 1906, and May 1907, and in 'Birds of Yorkshire,' Vol. I., page 242.

The last report recorded in 'The Naturalist' was from Barden, April 3rd, 1907, since then it appears to have frequented the Hetton Moors, between Rylstone and Malham, during the summer of 1907, where I saw it in company with another crow, probably its mate.

In August of that year it was shot at several times by grouse shooters on the moors, but always escaped, a fate which did not favour its mate, which was shot towards the end of that month.



Albino Carrion Crow.

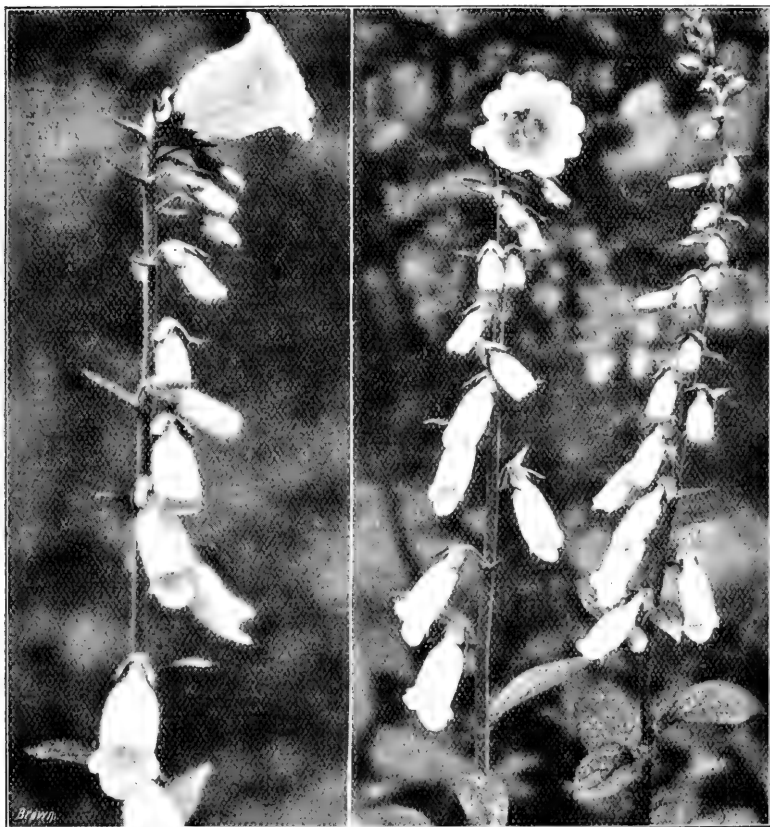
During the winter of 1907-8 it appears to have retired to the Fountain Fell district, along with a number of other crows.

This last summer (1908), it again made its appearance in the Winterburn district, but this time it was not as bold, and escaped from many attempts to secure it, until finally it was shot in May, near Eshton Tarn, by a keeper of Sir M. Wilson, Bart, who had been baiting for it with dead rabbits for some weeks. Sir M. W. Wilson of Eshton Hall, has had the bird set up for his private collection. The measurements are: length,  $17\frac{1}{2}$  inches; bill,  $2\frac{1}{4}$  inches; wing (expanse),  $12\frac{1}{2}$  inches; tarsus,  $2\frac{1}{2}$  inches.

## PELORIA IN PLANTS.

E. SNELGROVE, B.A.

THE accompanying figures (from photographs), show a Foxglove grown in a Sheffield garden during the past summer. The resemblance of the top flower to a *Campanula* is very striking, so much so that people who saw it growing, described it as such.



*Peloria* in Foxglove.

Two facts are plainly brought out in the photographs :— (1) that the top flower, unlike the others, is regular ; (2) that it is opening as early as the lowest flowers of the raceme.

The occurrence of this kind of thing, viz., a regular flower produced on a plant that normally bears irregular flowers, is known as *peloria*. The name explains nothing, for it only

Naturalist,

means a monstrosity or sport. Perhaps that is all that can be said with certainty. Darwin notes that those flowers nearest the axis are most subject to peloria, and thinks such occurrence 'may be connected with a different flow of nutriment towards the central and external flowers.' He seems to have in mind chiefly the disk flowers of a composite like the Daisy. In such a case the growth of irregular ray flowers seems to be precisely the opposite to what has occurred in our present example.

In the 'Transactions of the Woolhope Naturalists' Club,' 1902, p. 49, there is a note (with plates), on a similar instance of peloria, but it occurred on every branch of the plant, the number of corolla lobes was in each case doubled, and the number of stamens was also double, distinctly leading to the suggestion made that two flowers had become one.

Examples are often met with (in fact in some years are quite common) of Daisies, Buttercups, Wallflowers and Dame's Violet producing broad, flat, flowering axes, on which flowers are crowded, and often run into one another.

The Toadflax, again, is said (I have not seen it) to produce sometimes a five-spurred flower.

Two conclusions are fairly clear :—

(1) The examples of peloria in *Compositæ* and *Umbelliferae*, as quoted by Darwin, are quite different from all the other examples here adduced, unless (as certainly does not appear to be the case), he suggests that flowers like those of the Dandelion, are normal, and the disk flowers of the Daisy 'abnormally symmetrical.'

What is the meaning of the statement that 'flowers nearest the axis are most subject to peloria?' The ray flowers of a composite are not nearest the axis.

(2) The obvious explanation of the malformations of Buttercups, etc., known as *fasciation*, is that two (or more) flowers have grown together.

This explanation may stand for the Foxglove *peloria*, but what of the five-spurred Toadflax? It might be suggested that the case of the former was one of reversion to regular form, but the number of corolla lobes is against such a conclusion.

Perhaps all we can say is—

(a) Buttercups, etc., exhibit fasciation.

(b) Toadflax correlated variation, and the Foxglove something of both.

# THE PHYTOPLANKTON OF THE ENGLISH LAKE DISTRICT.

WM. WEST, F.L.S.,  
AND  
G. S. WEST, M.A., D.Sc., F.L.S.

(Continued from page 122).

14. *Codale Tarn, Westmorland.* June 1903. Altit. 1528 feet. A small mountain tarn receiving the drainage from parts of Tarn Crag (1801 feet) and High White Stones (2374 feet). The plankton contained various filamentous Chlorophyceæ, such as *Microspora abbreviata* and species of *Mougeotia*. Washed in from the shores of the tarn were filaments of *Binucleara tatrana*, fragments of *Stigonema minutum*, and a few filaments of *Ham-matoidea Normanii*. Numerous Desmids were present, among which should be mentioned *Cosmarium ornatum*, *C. bioculatum* *Arthrodesmus Incus*, *Staurostrum anatinum*, and *Gymnozyga moniliformis*. The most abundant Diatom was *Tabellaria flocculosa*, and long ribbons of *Eunotia pectinalis* were frequent. *Peridinium Willei* was again much in evidence.

15. *Easedale Tarn, Westmorland.* May 1903. Altit. 915 feet. A small lake, about a third of a mile in length, with rocky shores. The dominant features of the plankton were numerous

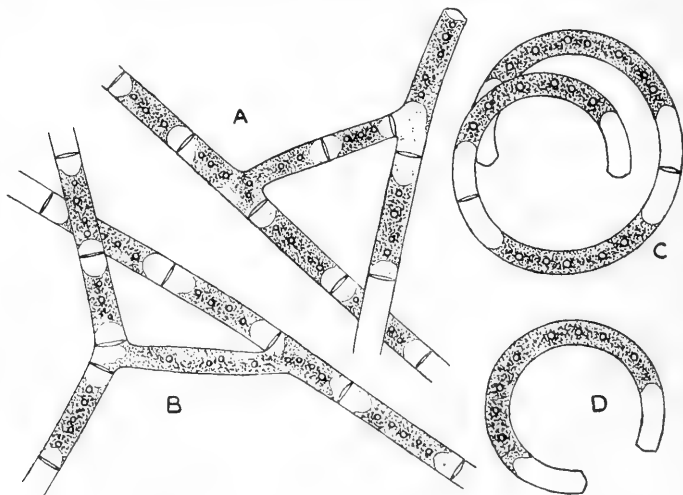


FIG. 1. A. and B.—Filaments of *Mougeotia* sp. from the plankton of Easedale Tarn ( $\times 200$ ), showing a curious anastomosis which may be due to aborted conjugation. C. and D., Coiled filaments of *Mougeotia* sp., from the plankton of Grasmere ( $\times 200$ ). D. consists of one cell only.

Desmids, and a large quantity of *Peridinium Willei*. The Desmids included *Penium truncatum*, *Micrasterias radiata*, *Arthrodesmus triangularis* var. *subtriangularis*, *Hyalotheca mucosa*, *H. neglecta*, *Staurastrum Arctiscon*, *St. gracile* var. *nanum*, *St. anatinum* var. *Lagerheimii*, *St. Ophiura*, and *St. Brasiliense* var. *Lundellii*. The two latter have not previously been found in England. The principal Diatoms were *Tabellaria flocculosa*, *Eunotia pectinalis*, and *Vanheurnkia rhomboide* var. *saxonica*. A sterile species of *Mougeotia* was common, and a curious anastomosis of two filaments was observed. The connections between the filaments may have been the result of aborted conjugation, and were cut off either completely or partially from the cells of the filaments (Fig. 1 A. and B.).

The Rotifers *Polyarthra platyptera*, *Anuraea cochlearis*, and others, were frequent, and a number of specimens of *Nebela flabellulum* were observed.

Fragments of *Binucleara tatrana* were fairly common in the plankton.

16. *Stickle Tarn, Westmorland.* May 1903. Altit. 1540 feet. This is a mountain tarn about a quarter of a mile in length and breadth, lying just under and to the eastward of Langdale Pikes (2401 feet). The dominant feature of the plankton was *Peridinium Willei*. Very few Desmids occurred, although *Staurastrum pseudopelagicum* deserves special mention, as it was observed only from this lake, and from Windermere. Diatoms (even *Tabellarias*) were few, and *Dinobryon cylindricum* var. *divergens* existed in small quantity. Entomostraca were in fair abundance, and much dark-brown organic matter was present. *Binucleara tatrana* was again observed in the plankton.

17. *Windermere.* Altit. 130 feet. This is the largest of the English lakes, having a length of about 10½ miles, and a maximum breadth of about a mile. Average depth 78 feet; maximum depth 219 feet. The lake is on the boundary between Westmorland and the northern extremity of Lancashire. Its margins are largely rocky, with a good deal of woodland, but the hills immediately around it are not very high. Its waters are no doubt contaminated by the proximity of the villages of Bowness and Ambleside. Material was collected from this lake in June and September 1903, and periodical monthly collections were made from September 1907 to August 1908. These are considered in detail in a special part of this paper.

## TABLE OF PHYTOPLANKTON.

The species are recorded in their respective columns by means of a "X." No attempt has been made to indicate their relative frequency, as such a record would not be strictly comparative, the collections not all having been made at the same season of the year.

In the larger genera, the species are arranged in alphabetical order.

SPECIES.	Cumberland.							Westmorland.										
	Buttermere.	Crummock Water.	Ennerdale Water.	Derwentwater.	Bassenthwaite Water.	Thirlmere.	Wastwater.	8	9	10	11	12	13	14	15	16	17	Windermere.
<i>Chlorophyceae.</i>																		
<i>Edogonium</i> spp. (sterile)	..																	
<i>Ulothrix subtilis</i> Kütz. var. <i>variabilis</i> (Kütz.) Kirchn.	..																	
" <i>zonata</i> (Web. & Mohr) Kütz.	..																	
<i>Microspora amena</i> (Kütz.) Rabenh.	..																	
" <i>abbreviata</i> (Rabenh.) Lagerh.	..																	
<i>Mougeotia elegantula</i> Witttr.	..																	
" spp. (sterile)	..																	
<i>Zygnema</i> sp. (sterile)	..																	
<i>Spirogyra</i> spp. (sterile)	..																	
<i>Gonatozygon monotonum</i> De Bary	..																	
" var. <i>pilosellum</i> Nordst.	..																	
<i>Cylindrocapsa diplospora</i> Lund. var. <i>major</i> West	..																	
<i>Pentium truncatum</i> Bréb.	..																	
" <i>minutum</i> (Ralfs) Cleve	..																	



SPECIES.	Cumberland.							Westmorland.									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>Nedrium Digtus</i> (Ehrenb.) Itzigs. & Rothe	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Glosterium acutum</i> Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>Kützingeri</i> Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>parvulum</i> Näg.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>sedacum</i> Ehrenb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>tumidum</i> Johns.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Pleurodinium Ehrenbergii</i> (Ralfs) De Bary	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Tetmemorus granulatus</i> (Bréb.) Ralfs	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Euastrum ansatum</i> Ralfs	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>bidentatum</i> Näg.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>elegans</i> (Bréb.) Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>montanum</i> W. & G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>pectinatum</i> Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>verrucosum</i> Ehrenb. var. <i>reductum</i> Nordst.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>Microsterias denticulata</i> Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>Mahabuleswarensis</i> Hobson var. <i>Wallichii</i> (Grun.) W. & G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>papillifera</i> Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>pinnatifida</i> (Kütz.) Ralfs	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>Sol</i> (Ehrenb.) Kütz. [= <i>M. radiosa</i> Ralfs]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>radiata</i> Hass. [= <i>M. furcata</i> Ralfs]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>truncata</i> (Corda) Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>Cosmarium abbreviatum</i> Racib. var. <i>planctonicum</i> W. & G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>bioculatum</i> Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>Blythii</i> Wille	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>Botrytis</i> (Bory) Menegh.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>capitulum</i> Roy & Biss. var. <i>granlandicum</i> Börges.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>connatum</i> Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>contractum</i> Kirchn. var. <i>ellipsoideum</i> (Elfv.) W. & G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>controversum</i> West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>costatum</i> Nordst.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>depressum</i> (Näg.) Lund.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

## SPÉCIES.

	Cumberland.							Westmorland.									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>Cosmarium depressum</i> var. <i>achondrium</i> (Boldt.) W. & G. S. West	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	×	..
<i>difficile</i> Lütken. var. <i>sublevis</i> Lütken.	..	..	..	..	..	×	..	..	..	..	..	..	..	×	..	..	..
<i>formosulum</i> Hoff.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..
<i>Logtense</i> Bissett	..	..	..	..	..	..	..	..	..	..	..	..	×	×	×	..	..
<i>margaritifera</i> Menegh.	..	..	..	..	..	..	..	..	..	..	..	..	×	×	×	×	×
<i>ornatum</i> Ralfs	..	..	..	..	..	..	..	..	..	..	..	..	×	×	×	×	×
<i>punctulatum</i> Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	×	×	×	×	×
<i>quadratum</i> Ralfs forma <i>Willei</i> (Schmidle) W. & G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	×	×	×	×	×
<i>reniforme</i> (Ralfs.) Arch.	..	..	×	×	×	×	×	..	..	..	×	..	..	..	..	..	..
<i>subarctatum</i> (Lagerh.) Racib.	..	..	×	×	×	×	×	..	..	..	..	..	..	..	..	..	..
<i>subcuneatum</i> Hantzsch	..	..	×	×	×	×	×	..	..	..	..	..	..	..	..	..	..
<i>subtimum</i> Nordst. var. <i>Klebsii</i> (Gutw.) W. & G. S. West	..	×	×	×	×	×	×	..	..	..	..	..	×	×	×	×	×
<i>Turpinii</i> Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	×
<i>Xanthidium antilopæum</i> (Bréb.) Kütz.	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
var. <i>depauperatum</i> W. & G. S. West	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
var. <i>triquetrum</i> Lund.	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
<i>armatum</i> (Bréb.) Rabenh.	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
<i>cristatum</i> Bréb. var. <i>uncinatum</i> Bréb.	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
<i>subhastiferum</i> West var. <i>Murrayi</i> W. & G. S. West	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
<i>Arthrodesmus convergens</i> Ehrenb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>crassus</i> W. & G. S. West	..	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
<i>tucus</i> (Bréb.) Hass.	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
var. <i>Ralfsii</i> W. & G. S. West	..	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
<i>triangularis</i> Lagerh.	..	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
var. <i>subtriangularis</i> (Borge) W. & G. S. West	..	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
<i>Staurosium anatinum</i> Cooke & Wills	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
var. <i>Lagerheimii</i> (Schmidle) nob.	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
<i>Arcticon</i> (Ehrenb.) Lund.	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
<i>brachiatum</i> Ralfs.	..	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
<i>brasilense</i> Nordst. var. <i>Lundellii</i> W. & G. S. West	..	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
<i>brevispinum</i> Bréb. var.	..	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×

## SPECIES.

	Cumberland.										Westmorland.									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17			
<i>Staurastrum curvatum</i> West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>cuspidatum</i> Bréb. var. <i>maximum</i> West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>dejectum</i> Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>denticulatum</i> (Näg.) Arch.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>erasum</i> Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>furcigerum</i> Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>gracile</i> Ralfs	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
var. <i>nanum</i> Wille.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>grande</i> Bulnh.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>hexacerum</i> (Ehrenb.) Witttr.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>inflexum</i> Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>irregularare</i> W. & G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>jaculiferum</i> West forma <i>biradiata</i>	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
forma <i>triradiata</i>	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>longispinum</i> (Bail.) Arch.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" var. <i>bidentatum</i> (Witttr.) W. & G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>lunatum</i> Ralfs var. <i>planctonicum</i> W. & G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Manfeldtii</i> Delp.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>megacanthum</i> Lund.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>micronatum</i> Ralfs var. <i>subtriangulare</i> W. & G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Ophiura</i> Lund.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>paradoxum</i> Meyen	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
var. <i>cingulum</i> W. & G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
var. <i>longipes</i> Nordst.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>pachynorphum</i> Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>pseudopelagicum</i> W. & G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>punctulatum</i> Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>sextangulare</i> (Bulnh.) Rabenh.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>teliferum</i> Ralfs	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>vestitum</i> Ralfs.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>vestitum</i> Ralfs.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Spondylosium pulchrum</i> (Bail.) Arch. var. <i>planum</i> Wille	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

## SPECIES.

	Cumberland.										Westmorland.									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17			
<i>Sphaerosoma vertebatum</i> Ralfs var. <i>punctulatum</i> W. & G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>Aubertianum</i> West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>granulatum</i> Roy & Biss.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Desmidiium Seawardii</i> Ag.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>aplogonum</i> Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Gymnozyga moniliformis</i> Ehrenb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Hydrotheca dissiliens</i> (Sm.) Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>Indica</i> Turm.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>mucosa</i> (Dillw.) Ehrenb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>neglecta</i> Racib.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Eudorina elegans</i> Ehrenb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Pediastrum Boryanum</i> (Turp.) Menegh.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>glanduliferum</i> Benn.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Crucigenia rectangularis</i> (Näg.) Gay	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Scenedesmus bijugatus</i> (Turp.) Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Ankistrodesmus falcatus</i> (Corda) Ralfs.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Ankistrodesmus falcatus</i> var. <i>acicularis</i> (A. Br.) G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
var. <i>spirilliformis</i> G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>Pfitzeri</i> (Schröder) G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Elakabothrix gelatinosa</i> Wille.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Oocystis lacustris</i> Chodat.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>parva</i> W. & G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Nephrocystium lunatum</i> West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Dictyosphaerium pulchellum</i> Wood	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Botryococcus Braunii</i> Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Glauocystis gigas</i> (Kütz.) Lagerh.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Sphaerocystis Schroeteri</i> Chodat	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Tetraspora lacustris</i> Lemm.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
BACILLARIÆ.																				
<i>Melosira granulata</i> Ralfs.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

## SPECIES.

SPECIES.	Cumberland.							Westmorland.									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>Cyclotella compta</i> Kütz ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Rhizosolenia morsva</i> W. & G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Tabellaria fenestrata</i> (Lyngb.) Kütz. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
var. <i>asterionelloides</i> Grun.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>flocculosa</i> (Roth.) Kütz ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Diatoma elongatum</i> Ag.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Fragilaria capucina</i> Desmaz. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>crotonensis</i> (A. M. Edw.) Kitton	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Synedra Ulna</i> (Nitzsch) Ehrenb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>pulchella</i> Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>Acus</i> (Kütz.) Grun.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>radians</i> (Kütz.) Grun.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>Asterionella formosa</i> Hass.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>gracillima</i> Heib.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Ceratoneis Arcus</i> (Ehrenb.) Kütz. var. <i>Amphioxys</i> (Rabenh.) De Toni	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Eunotia lunaris</i> (Ehrenb.) Grun.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>pectinalis</i> ((Kütz.) Rabenh.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>gracilis</i> (Ehrenb.) Rabenh.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>major</i> (W. Sm.) Rabenh.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>biceps</i> (W. Sm.) G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Navicula major</i> Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>viridis</i> Kütz. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>gibba</i> (Ehrenb.) Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>radiosa</i> Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Stauroneis Phoenicenteron</i> Ehrenb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Vanheurnckia rhomboides</i> (Ehrenb.) Bréb. var. <i>saronica</i> (Rabenh.) G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Gomphonema constrictum</i> Ehrenb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>geminatum</i> Ag. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>intricatum</i> Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>olivaceum</i> (Lyngb.) Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Cocconeia cymbiforme</i> Ehrenb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

(To be continued).

## ‘A’ MR. DARWIN.

REV. W. C. HEY, M.A.

IT is well known that Darwin was first attracted to the study of Natural History by the Coleoptera. My grandfather, the Rev. Samuel Hey (of Ockbrook), was a beetle-collector, and it thus happens that in some old letters I recently looked over, I found two interesting references to the father of modern science. My grandfather, writing to my father (the late Archdeacon Hey), on September 16th, 1829, says :—‘ Mr. Fox brought over a relative of his, Mr. Darwin, to see my collection. They both pronounced it a very fine collection for so small a one, and discovered in it several very rare insects, and such as they had never before seen. Mr. Darwin, indeed both of them, were captivated with the Snowdon beauties. Mr. Darwin wants to know on what part of Snowdon you took the *Chrysomela cerealis*, and on what plant, as he means to go there on purpose to search for it. This he can readily do, as he lives at Shrewsbury. He named a great many insects for me. I gave them one of my three specimens of *Epaphius*, and he and Mr. Fox were to toss up for it ! ’

The other reference occurs in a letter to my father from an aunt. She writes :—‘ A Mr. Darwin has been to see your father’s insects.’ And with rare discrimination, she adds this mild praise—‘ He seemed a very intelligent man.’ The old lady was a Calvinist after the strictest sort. Could she have dipped into the future, she would *not* have thought it was an angel she had been entertaining unawares, but—well, something quite different.



Evidently our contributor, Mr. T. Petch, B.Sc., Government Mycologist in Ceylon, is in his old form for work. Amongst the pamphlets recently received from him may be mentioned ‘ Insects and Fungi ’ ; from ‘ Science Progress ’ ; ‘ The Genus *Endocalyx*, Berkeley and Broome (with plate and description of *E. cinctus* n. sp.), from the Annals of Botany ; and ‘ Die Pilze von *Hevea brasiliensis* (Para Kautschuk) ’ ; from ‘ Zeitschrift für Pflanzenkrankheiten.’

The following method of collecting aquatic coleoptera, in vogue in America, may be worth trying by our readers interested :—‘ To collect in flowing streams, a loosely-woven cloth should be stretched across and through the stream, and the stones, gravel and sand overturned and stirred up a short distance above it. The dislodged beetles will be swept into the cloth to which they will cling for support, and it is only necessary to draw up the cloth, and reap the harvest.’ The writer adds that on one occasion he secured 700 beetles in this manner, after stirring up about two feet of sand and gravel.

## HAWKWEEDS.

JOHN CRYER.

IN an interesting article in the ' Journal of Botany ' for January and February, the Rev. A. Ley, M.A., dealt with the groups and species of the West Yorkshire hawkweeds and their distribution as far as they have been ascertained. Much work, however, remains to be done before the list of West Yorkshire hawkweeds and the distribution, are at all adequately known. Grassington and the immediate neighbourhood are fairly rich in hawkweeds, as the following list of species gathered by the writer will testify :—

- (1) *Hieracium hypochaeroides* Gibs., var. *saxorum* F. J. Hanb.
- (2) „ *britannicum* F. J. Hanb., var. *ovale* Ley.
- (3) „ *silvaticum* Gouan., var. *asymmetricum* Ley.
- (4) „ var. *subcyaneum* W. R. Linton.
- (5) „ *cymbifolium* Purchas
- (6) „ *duriceps* F. J. Hanb. (Type)
- (7) „ *scanicum* Dahlst.
- (8) „ *sciaphilum*, Uechtr., var. *transiens* nov. var.
- (9) „ *strumosum* sp. nov.
- (10) „ *sparsifolium* Lindeb., var. *placerophyllum*  
Dahlst.
- (11) „ *tridentatum* Fr., var. *acrifolium* Dahlst.
- (12) „ *rigidum* Hartm., var. *calcaricolum* F. J. Hanb.

On comparing the above with Mr. Ley's list it will be noticed that numbers 9, 11, and 12, are not recorded for the West Riding of Yorkshire, and numbers 1, 2, 6, 7 and 8 are not recorded for Wharfedale, and the rest are not recorded for Grassington and the immediate district.

*H. sarcophyllum* Stenstr. is recorded by Mr. Ley for Langcliff, Ribblesdale. The writer gathered a fine specimen at Malham, August 2nd, 1906, also a specimen of *H. britannicum* F. J. Hanb., var. *ovale*, Ley, and one of *H. cerebridens* Dahlst., in the neighbourhood of Malham. Fine specimens of *H. scanicum* Dahlst. were found growing near Leeds in September of last year, along with *H. cacuminatum* Dahlst. Mr. Ley says of this latter, ' rare in Britain.'

*H. Gothicum* Fr., described by Mr. Ley as ' not common,' was found by the writer in fair abundance near Shipley, August 1907.

*H. prenanthoides* Vill., grows in abundance near Buckden, and typical *H. anglicum* Fr. is to be found near Buckden and Kettlewell.

Mr. Ley has seen all the above specimens, and I have to acknowledge my indebtedness to him for his generous help in naming them.

## YORKSHIRE MOSSES.

C. A. CHEETHAM.

DICRANODONTIUM LONGIROSTRE B. & S. var. ALPINUM Schp.

Whilst on a visit to Buckden last November, with Mr. A. R. Sanderson, we found this moss in plenty, high up the hillside where the woods and moors join. It is the *Campylopus alpinus* of 'Lees' Flora,' and this will be a second locality for it, the other being Inglebro', where it occurs in sheets in the turf on the south shoulder.

Mr. A. Wilson, F.L.S., who has found it in West Lancashire on Greycarth and Thrushgill Fells, says that the additional locality is very interesting, and he suggests that it may be found on other high peat-covered fells. On the same occasion we found the var. *calvescens* Hobk. of *Hylocomium squarrosum* B. and S.

DICRANODONTIUM LONGIROSTRE B. and S.

This is the type of which the above is now considered a variety. It occurs in shade in woods on humus, whilst the variety is found in the open on turf or peat. In January last I found this moss in Guy's Cliff Woods, Pateley Bridge, which is a new drainage area for it, the previous records being:—Wharfe, Bolton Woods, Dr. Wood (I gathered it here last Christmas); Calder, Heptonstall, J. Nowell.

PHASCUM FLØRKEANUM Web. and Mohr.

On the occasion of the annual meeting at Doncaster last December, I gathered this moss in Cusworth Park. It is an additional species to the West Riding list.

BARBULA GRACILIS Schwæg.

A moss which I found at Knaresbro' in May 1908, and which I submitted to the Moss Club as *B. Hornschuchiana* Schultz, has been determined to be the above species by Mr. W. E. Nicholson and Mr. H. N. Dixon, F.L.S. This is also a new species to the West Riding.



*ANÆCTANGIUM COMPACTUM* Schwæg.

The only locality given in our flora for this is Whernside. On a visit to the upper part of Rawtheydale (Uldale) in February 1909, I saw it in quantity and in very fine 'fruit.'

*BARTRAMIA POMIFORMIS* Hedw. var. *CRISPA* B. and S.

In the last-named locality I found this moss, which is new to West Yorkshire. In growth and shape of leaf it is very near to *B. Halleriana* Hedw., which also grows in the district. The two can be better distinguished by habit and colour whilst fresh, than from dried specimens and single leaves.

I am indebted to Mr. W. Ingham, B.A., and the above-mentioned gentlemen for assistance in the verification of these mosses.

**Behind the Veil in Birdland**, by **Oliver G. Pike, F.Z.S.** London : The Religious Tract Society. 106 pp., 10/6 net.

In this large and handsome volume Mr. Pike has selected and reproduced twenty-four from his thousands of photographs, and of these, four are of mammals, as they are considered to be in 'Birdland.' The two dozen plates are evidently enlargements from photographs, and presumably are all taken direct from life. Accompanying each plate is some descriptive letterpress; but unfortunately, as with some other bird-photographers, the author dwells far too much upon the hardships and risks and trials of photographing birds: the number of hair-breadth escapes being really appalling. In fact, some of these almost get the flavour of the stories of another kind of naturalist, viz., the one who 'goes angling'—A gannet nearly knocked him into the sea; it took him two days to get a photograph of a Great-crested Grebe; another two days was occupied in photographing two sparrows, etc. All this is, of course, probably true; but we have seen hundreds of quite as interesting photographs of quite as difficult 'sitters,' which were taken in reasonable time and without any risk to life or limb. The volume is marvellously cheap at half-a-guinea, and we congratulate the author on finding a title that has not been used before—a daily increasing difficulty!

**British Butterflies and other Insects.** Edited by **Edward Thomas.** London: Hodder & Stoughton. 127 pp., 6/-

'There is a difference between a grub and a butterfly; yet your butterfly was a grub.' Such is the Shakespearian entomological observation quoted in this volume. And we might add—'There is a difference between "British Country Life" and "British Butterflies and other Insects," yet the latter was once part of the former.' And whilst there is nothing to indicate that such is the case, the new book is simply the entomological articles reprinted from Messrs. Hodder and Stoughton's two charming volumes on 'British Country Life' already noticed in these columns. In this present attractive and cheap form, however, our readers will doubtless be glad to have these 'Insect' articles by themselves, and we think the publishers have acted wisely in presenting them in their present form, particularly if it repays them for their enterprise in producing such really admirable books so cheaply. There are articles by A. Collett, G. A. B. Dewar, Richard South, A. W. Rees, and F. P. Smith, all being written in a style redolent of the fields and woods and heaths. The coloured plates from photographs are also well in keeping with the book, and considerably add to its attractiveness.

## NOTES ON ROOKS.

F. M. BURTON, F.L.S., F.G.S.

ROOKS are unusually abundant in the Gainsborough neighbourhood, and, in one way or another, are always in evidence from early morning until darkness sets in at night ; so that opportunities for observation are numerous. Within a radius of about a mile from my house, and, for the most part within half that distance, there are, at least, twenty separate rookeries, big and little ; most of them on the slope of the Keuper escarpment above Gainsborough facing west, and so protected from the cutting easterly winds so common in this district.

When the nesting period is well over, and during the winter months, all the birds roost in woods on the east of the town, repairing there from the low lands of the Trent valley, their favourite feeding-place, in large or small flocks, with a solitary straggler here and there bringing up the rear as the day closes in ; and in the mornings, when daylight returns, they all fly back with loud cawings, to feed in the valley again or on the newly turned-up plough lands. In addition to the worms and grubs of the marshes and plough-lands, anything in the shape of a nut has a special attraction for them ; and they will strip a tree year after year, when once they find it out. I have several solitary walnut trees in the fields around my house, and long before the nuts are ripe and ready to be gathered, the rooks carry them off. I have seen a tree black with these marauders, and have watched the birds flying off with the nuts in their beaks. For a long time I could not make out what they did with them, until one day, on digging into a heap of soil left ready for the garden, some of the nuts turned up. The rooks had learnt that the thick, green coating of walnuts, if buried in the ground, will come off ; and though the nuts by this process are not properly ripe, indeed far from it, I have been obliged to take a lesson from the rooks and follow their example, on the principle of 'half a loaf being better than no bread.' It is not only the walnuts that they steal, but anything suggestive of a nut as well. I have a Turkey Oak on my lawn, the fruit of which, with its rough bristly protection, is regularly attacked by the rooks. Some of the acorns may be carried off and eaten, but, at all events, the greater part is thrown down, and left lying under the tree ; and, whether good

for food or not, it is clearly a point of honour with them to strip the tree every year.

Rooks in general avoid the near presence of man. In the winter, however, when the ground is frozen hard or the land buried in snow, they will venture to approach the food put out for the starving birds, using, however, the greatest caution in doing so. I have seldom, even in the worst seasons, seen a rook near my windows, but they will sit on the branches of the trees near the food, and if a piece of bread or anything falls to the ground they will make a dash for it and carry it off. I have seen them sometimes fly close past the stage on which the food is placed, and either seize a piece or knock it off with their wings, and then pick it up. They will also fly after a bird carrying off food in its beak and force it to drop it. In the early mornings too, when no one is about, they will take away the small bones hung out for the Tits. In fact, they steal and bully whenever they can.

The following is an account of the most extraordinary event in the social economy of these birds that I ever met with. The crest of the steep escarpment on the east of Gainsborough, already alluded to, was cut through in the old coaching days to lower the gradient and reduce the slope; the spoil being banked up on the road below, thus raising it up considerably above the fields on its north side. Walking down this road one day, I saw through the hedgerow in one of the fields, a large circle of rooks assembled on the grass, several deep, all with their heads turned towards the centre where one solitary bird was standing. The circle, I should say, was about thirty feet in diameter. Presently, out stepped an old bird from the ring, and with that half-walk, half-flight motion, common to some of the larger birds, went up to the rook in the middle, and attacked it with its beak, stabbing it on the head for about a minute, after which, suddenly the whole body of the birds rose up and flew away leaving the victim alone in the centre. It was not dead, and it tried to stand, supporting itself with its wings; in which way, falling and stumbling as it moved off, it managed to reach the opposite hedge, which was not far off, and I saw no more of it. The gate leading into the field was some distance off, and I had no time to spare. The victim, judging from the size of the old rook which stepped out to kill it, appeared to be a young bird, one perhaps of the first year, inexperienced in rook law.

It would most probably die. That they meant to kill it is certain, and had not my presence, or something else, disturbed them, they would have done it. What it had done I cannot say. It might persistently have stolen twigs from the nests of other birds—a dire offence with rooks—or, perhaps, got at their eggs. Some flagrant breach of rook-law had, doubtless, been committed, and, after trial by a jury of its fellows, it had been condemned to death. It was a remarkable scene, and from the conclave of birds assembled to witness the execution, and their complete and orderly silence, the proceeding had something distinctly impressive about it. Doubtless this tragedy has been witnessed by others, but I should imagine by very few. Mr. W. Warde Fowler in his ‘*Tales of the Birds*,’ recounts a similar incident, and, though it is told as a tale, no doubt he either witnessed it himself, or had it from some good and credible source.

The fact of this tragedy having been seen by others, and not being an isolated case, renders it more interesting, as it points to a high state of established order, and even morality, in the lives of these interesting birds and their dealings one with another.



Mr. Horace B. Woodward, F.R.S., assistant Director of the Geological Survey of England and Wales, retired from public service on December 31st last. We trust that he may long be spared to enjoy his rest from official duties, though doubtless he will still find much to occupy his time.

We learn from ‘*Nature*’ that Mr. Silva White, the Assistant Secretary of the British Association, has resigned. At a recent meeting of the Council cordial thanks were expressed to Mr. White, ‘but it was resolved that the Assistant Secretary should not be a member of the Council; and as this was the chief condition under which he would continue in office, his resignation was accepted.’

‘*The Yorkshire Herald*’ for February 1st, has three columns devoted to ‘*A Yorkshire Naturalist—Mr. William Hewett and his work, who has collected nearly 40,000 specimens.*’ It is illustrated by sketches of Mr. Hewett, Sabine’s Gull, Puffin, and ‘*Hewett’s swing.*’ The last is not prophetic, but is from a photograph of Mr. Hewett in mid-air at Buckton, collecting eggs of Guillemot, Razorbill and Puffin. We learn that the British Museum ‘take second place’ with regard to Guillemot eggs, Mr. Hewett’s being the finest collection in the world. He also is said to possess a *complete* collection of British land, marine, and fresh-water shells. In an examination recently on ‘*Evolution*,’ Mr. Hewett wrote twenty-three sheets of foolscap in three hours. He has a certificate for shorthand, knows French, and has recently been asked for a summary of his life’s work by an American publishing firm. We also learn that the Rev. T. B. B. Ferris, M.A., formerly vicar of St. Thomas’s, York, said, in a letter to the ‘*Herald*,’ dated April 27th, 1882, ‘*Mr. Hewett, a most enthusiastic naturalist.*’ Those who know Mr. Hewett will agree with this; those who don’t, won’t recognise him again from the “protrait” given in the ‘*Herald*.’

## THE PRESENT STATE OF OUR KNOWLEDGE OF CARBONIFEROUS GEOLOGY.\*

DR. WHEELTON HIND, F.R.C.S., F.G.S.

THE choice of an address to a Society consisting of so many sections is an anxious one. Either the address must be on very broad lines, dealing with general principles, or, if technical, and addressed to one section only, the majority of those who are learned in other branches of natural science suffer in the interests of the few. I was told, however, that I was expected to specialise on this occasion, by those whom I dare not disobey, and it seems to me that it will not be amiss to examine the present state of our knowledge of Carboniferous Geology, and to draw attention to important questions which are urgently needing solution, though to compress this subject into a presidential address will be difficult.

In the year 1888 was published a Volume of Reports of the British Sub-Committees on Classification and Nomenclature of the International Geological Congress, in which was amongst others, a 'report on the Carboniferous, Devonian and Old Red Sandstone.' In it are given tables of the general succession of the Carboniferous Rocks in various districts of Great Britain and Ireland, but in only one single instance (p. 143), is even the Generic name of a fossil mentioned.

Since that date, fortunately, our knowledge of Carboniferous palæontology and fossil distribution has advanced, and I think we may claim that to-day the broad lines of life zones of the Carboniferous Rocks have been laid down, and firmly established on a sound footing, and the work of the future will have a foundation on which to build.

To-day it is a fairly easy task to read the sequence in any district, and on broad lines to correlate one district with another. In the first place, it is important to recognise that the lower Carboniferous Rocks were deposited on a sinking land of very irregular surface, so that portions only sank beneath the waves in time to receive deposits characterised by a fauna younger than that which obtains in the older beds. This fact is well illustrated by the comparison of the Bristol and North Wales Carboniferous Limestone series. The basement conglomerate

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\* Being the Presidential Address to the Yorkshire Naturalists' Union, delivered at Doncaster, December 10th, 1908.

of North Wales is succeeded by *Seminula* beds, a sub-division of which is comparatively high up in the Bristol succession.

Many of the present difficulties of British Carboniferous Stratigraphy are due to the fact that portions of the British Isles were dry land throughout the whole Carboniferous period. The whole of the North of Scotland, the Southern Uplands, the Lake District, parts of North-west and Mid Wales and Shropshire, the Mourne Mountains, and parts of Co. Wicklow, were not submerged even in lower Carboniferous times.

Out to the East, over Belgium, the Carboniferous sea was laying down deposits of Limestone, which can now be correlated with the lowest part of the Bristol Series, but still further East, in Germany, practically none of the lower Carboniferous Rocks are found at all, and the Carboniferous Series there commences with the Culm, containing a fauna which identifies those beds with the Pendleside Series of the Midlands.

In Russia, the lowest part of the Carboniferous Limestone is characterised by a fauna (*Productus giganteus*) which is associated in Belgium and Great Britain with the highest beds of the Series.

Not only locally, therefore, in the British Isles, but also across Europe there is an extensive overlap of the higher members of the Carboniferous Series, and it is of the utmost importance to work out the causes and conditions of this overlap, this question being one of world-wide importance. It would seem, too, that the key to the riddle is in the County of Yorkshire, and that the solution of the problem of the relationship of the Yoredale Series and the Pendleside group will go far to settle the whole question of European Carboniferous Geology.

The succession of Carboniferous Rocks in the Bristol area has been described in detail by Dr. Vaughan.\* The Avon gorge shews, with one fault and one slight repetition, a complete sequence of the Carboniferous Limestone series. Since that publication, Dr. Vaughan, Dr. Sibly and others have shewn that a similar sequence exists in the Mendips and in South Wales. Dr. Vaughan was able to shew that the whole sequence could be divided into broad life zones by the study of the Corals and Brachiopods, and that these life zones could be traced through South Wales. And there is very little doubt that these

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\* Q. J. Geological Soc., Vol. LXI., pp. 181-307.

life zones exist in Belgium, and that it will be a comparatively easy matter to correlate with some approach to exactness, the Carboniferous Limestone Series of the Meuse and Bristol, a view expressed by Lohest, many years ago, and previous to the publication of Dr. Vaughan's work.

Dr. Vaughan shews the Bristol sequence to be about 2300 feet thick, and thus he sub-divides it as follows:—

About 100 feet	E	
VISEAN.		
<i>Dibunophyllum</i>	D 2 }	400 feet
"	D 1 }	
<i>Seminula</i>	S 2 }	850 "
"	S 1 }	
TOURNAISIAN.		
<i>Syringothysis</i>		250 "
<i>Zaphrentis</i>	Z 2 }	350 "
"	Z 1 }	
<i>Cleistopora</i>	K	360 "
<i>Modiola</i>	M	100 "

Speaking generally, the fauna of the Bristol area is not rich in genera or species, except in Corals and Brachiopoda; Lamellibranchs, Gasteropoda, and Cephalopoda are exceedingly rare. Fish remains occur abundantly at certain horizons, but are rare in the *Dibunophyllum* beds. There are no shellbeds, such as are not uncommon in the Upper Limestones of the Midlands, indeed there is a very great difference in the faunas of the *Dibunophyllum* beds in these two areas, both in numbers of species, genera, and individuals.

In the Bristol district the *Dibunophyllum* beds pass up into a series attaining about 100 feet of limestone, which Dr. Vaughan has classed as (E.), which are characterised by brachiopods of a late *Dibunophyllum* type, which are common also in the Midland area. And on these limestones repose the so-called Millstone Grits of the British district, said to be about 980 feet thick, on which lie the Coal Measures, which, from the flora, would seem to represent only the upper moiety of the Coal Measures of the Midlands. Mr. Bolton has published the description of marine bands and their fauna passed through in an exploration heading at the Ashton Vale Colliery.\*

Unfortunately we know nothing more of the fauna or flora of this 900 feet of beds. The fauna of the marine band described by Mr. Bolton, has some resemblance to that associated with the Gin Mine of the North Staffordshire Coalfield,

\* Q. J. Geol. Soc., Vol. LXII., pp. 445-469.

and the latter bed is fairly high up in the Coal Measures of that Coalfield. The fish fauna is decidedly of a Coal Measure facies, and Mr. Bolton remarks that Plant remains of a Coal Measure type occur in black shale, a few feet below the marine bands. When compared to the Carboniferous succession in the Midlands where the *Dibunophyllum* zone is succeeded by more than 1000 feet of the Pendleside Series, and these beds in turn are overlaid by from 300–3000 feet of Millstone Grit, and that the Gin mine lies 5000 feet above the base of the Coal Measures in North Staffordshire, the question arises at once as to what do these 900 feet of Millstone Grit of Bristol really represent?

Dr. Kidston has shewn that the greater part of the Coal Measures of the Bristol area are represented by a Flora of high facies, and I am of opinion, from the evidence of the Mollusca, that the Pennant Series of coals correspond to the Black Band Series, and that portion of the Coal Measures immediately below them. Therefore the 900 feet of Grits represent, in point of time, all the Series between the *Dibunophyllum* beds, and a horizon high up in the Coal Measures.

A marine band has been discovered in the South Wales Coalfield, near its base at Glan, Rhymney, and Beaufort. This probably represents the marine band described by Mr. Bolton.

We also now know that the genus *Zaphrentis* is not confined to the lower beds in other areas, but in the Midland province and Scotland the same species which characterises the *Zaphrentis* zone of the Bristol area, occur with other species of this genus in the Upper *Dibunophyllum* beds.\*

#### CLEE HILL AREA.

The Carboniferous Limestone of the Clee Hill Area rests conformably on a series of upper Devonian rocks. The limestones exposed at Oreton and Farlow would appear, from the fauna contained in them to belong to *Zaphrentis* division of the Bristol sequence. These limestones are succeeded by some shaly beds which in turn are overlaid by a Millstone Grit and the Clee Hill Coal Measures.

There is no question that the age of the Coalfield is other than Coal Measures, a fact demonstrated by the flora, so that in this area there must be an unconformity to account for the

---

\* *Vide* Carruthers, 'Geol. Mag.', Dec. v., Vol.V., pp. 63 and 158.



absence of the whole of the Visean group of the Carboniferous Limestone,

#### NORTH WALES.

Mr. Stobbs and I have shewn that the Carboniferous Limestone Succession in North Wales approximates much more to the Midland type than to that of the Bristol area. The principal point of importance that we made out was the absence of the whole of the lower part of the Bristol sequence, the basement conglomerate being succeeded by Limestones of various horizons in the Visean ; and that in the most extreme cases, only about 500 feet of *Seminula* beds are represented. We were able to shew that the lowest Limestones of North Wales are characterised when present, by the presence of *Daviesiella Llangollensis*.

In certain localities Craignant, Llannt, Bron y Garth, Hafod near Corwen, Fron y Cysyllte, the *Seminula* beds are absent, and there is an overlap of *Dibunophyllum* beds, which rest unconformably on Silurian and Ordovician rocks.

Towards the top of the *Dibunophyllum* zone the beds become cherty in places, and a sub-zone distinguished by the presence of *Cyathaxonia* and *Amplexi-zaphrentis* is developed.

The Limestones are succeeded at Teilia and Prestatyn by the Teilia beds, a series of thin limestones and shales, containing a typical Pendleside fauna and flora, and probably in places, some of the regularly and thinly bedded Pendleside Limestone have been replaced by Cherts.

The Cherts of North Wales, therefore, are in the upper part of the *Dibunophyllum* and *Cyathaxonia* zones, and in the lower part of the Pendleside Series.

At Allinson's quarry, near Oswestry Racecourse, and near Bwlch Gwyn, north of Minera and at Halkin Mountain, the cherts contain corals, *Cyathaxonia* and *Brachiopoda*, and are certainly part of the Carboniferous Limestone.

The succession in North Wales may be explained as follows :

Coal Measures belonging to the Lower Coal Measures of Lancashire, about the Arley Seam, and with the marine beds of *Gastrioceras listeri* in any area.

Sandy Shales.

Pendleside Series of Teilia and Holywell.

*Cyathaxonia* beds.

Upper *Dibunophyllum*.

Lower *Dibunophyllum*.

*Seminula* beds.

Basement Conglomerate.

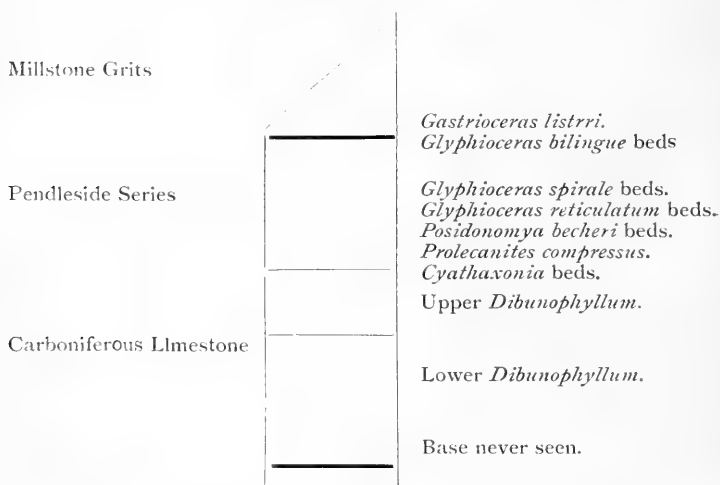
The Pendleside Series of Teilia and the Holywell and

Bagillt road, Nant-figilt afford an exposure of about 1000 feet, and yield a typical Pendleside fauna. They are succeeded by sandy and micaceous shales of Talacre dingle, and these are overlaid by the Gwespyr sandstone, which is a very thick bed of sandstone full of plant remains in a detrital state.

I consider it probable that the Gwespyr sandstone is the representative of the Millstone Grit, but we have no fossil evidence yet whether this is a Sandstone above or below that horizon, but there is little doubt that the Coal Measures of North Flint contain the representative of the Arley mine of the Lancashire Coalfield.

### THE MIDLANDS.

The Carboniferous sequence of the Midlands is important. The area over which this particular sequence obtains extends from Ashbourne in Derbyshire to Settle in Yorkshire, and is represented in the following diagram :—



The base of the Limestone has never been seen, and owing to the Tectonic structure of the area, we are totally ignorant of the thickness of the Limestone, or on what rocks it is superposed. Having collected Carboniferous Limestone fossils for many years in this area, I was aware that I had never obtained a fauna from which *Productus giganteus* was absent, and that the upper part of the Series was very rich in those corals which Dr. Vaughan associated with the *Dibunophyllum* zone.

Dr. Silby \* obtained very similar results in his study of the southern part of the district, and filled in several details. I have not been able to satisfy myself that any beds of a lower facies than the *Dibunophyllum* zone exist in Derbyshire, but the exposure of Settle reveals some *Seminula* beds underlying beds with a typical *Dibunophyllum* fauna.

The interesting point in Dr. Silby's paper is the recognition of the wide vertical expansion of the *Dibunophyllum* zone in the North Staffordshire-Derbyshire district, which measures, according to him, at least 1700 feet; whereas in the Bristol district, the whole zone is represented by only between 400—500 feet of limestones.

The Limestone with cherts, characterised by the presence of *Cyathaxonia* and other small corals, is well developed on the Staffordshire side of the anticlinal, and reaches near Warslow and Wetton 100-150 feet in thickness. At Wetton (Pepper Inn), and Butterton, North Staffordshire, these beds are overlaid conformably by black shales and Limestones, with a typical Pendleside fauna, *Pterinopecten papyraceus*, *Posidonomya becheri*, *Nomismoceras rotiforme*, *Glyphioceras striatum*, indicating the lowest zone of that series. Here the succession in the Upper *Dibunophyllum* Series is very similar to North Wales. Cherty in places, it is succeeded by a *Cyathaxonia* zone also cherty, passing conformably into the lowest Pendleside zone.

Beds with a similar faunal sequence are to be seen at many places further North. The Hodder Valley, Winterburn, Lothersdale, the Cracoe Hills and near Settle.

This large Derbyshire-Staffordshire Carboniferous area is also remarkable because of the enormous development of the Series of rock to which Mr. Howe and I gave the name Pendleside Series. This Series, in the Midlands, consists of a group of dark limestones and shales at the base, passing up into their well bedded dark limestones, which are succeeded by a black shale group. Then the shales become sandy, and pass up into standstones, ganister-like grits, and are overlaid by the Millstone Grit series. I estimate the extreme thickness of these beds to be about 1200 feet, and the greatest thickness seems to be at Pendle Hill.

The Series is of interest because it can be accurately zoned by a succession of cephalopod forms, which appear to indicate definite horizons which can be traced from the centre of Europe to the West coast of Ireland.

The Series appears to thin out rapidly south of Stoke-on-Trent, and North of Settle, the characteristic fauna has not yet been found in any beds between Settle and the Valley of the Clyde. The series also thins out to the West, being represented on the West coast of Ireland by about 80 feet of dark shales with calcareous nodules, and apparently representing the middle part of the Series, the characteristic *Goniatis* being *Glyphioceras reticulatum* and *G. diadema*. No trace of the fauna has been found in the Ingleboro' area, where Mr. Cosmo Johns has demonstrated the following succession:—Upper *Dibunophyllum*, Lower *Dibunophyllum*, *Seminula* beds, Basement Conglomerate.

A change in the method and character of deposition has set in between Settle and Ingleboro', which is of great importance. Within these few miles the lithological and faunal character of the sequence has largely altered, a fact well recognised by the older geologists with regard to the lithology, but the faunal change was not at all appreciated.

About the latitude of Settle the rich cephalopod fauna and the characteristic limestones and shales of the Pendleside Series disappear, and no trace has been found of them in the Yoredale Series. Moreover, wherever the Pendleside Series occurs it succeeds a Visean fauna of the highest facies.

The coral fauna which always underlies the *Posidonomya becheri* beds, throughout the area in which it is developed, consists of *Cladochonus bacillaris*, *Michilinia tenuisepta*, *Zaphrentis Enniskilleni*, and other species of the genera *Amplexi-zaphrentis* and *Cyathaxonia*, but in addition the Upper Visean beds of the Pendleside area are very rich in brachiopoda, Mollusca and Fish Remains. For example, a rich fish fauna is found in the Red beds or the highest limestones of the Yoredale Series in Wensleydale, and this fauna differs entirely from the fish fauna of the Pendleside Series, and agrees very markedly with the fish fauna found in the upper part of the limestone of Derbyshire and Staffordshire.

(To be continued).

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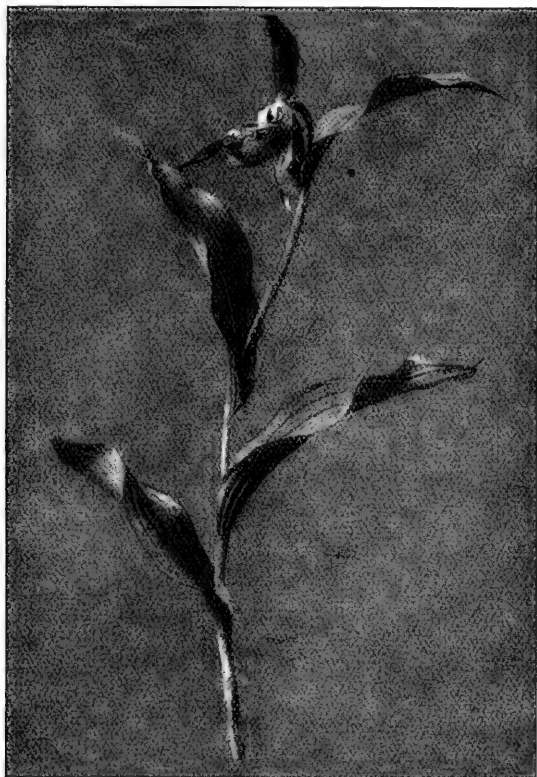
The Yorkshire Wild Birds' and Eggs' Protection Committee begs to acknowledge the receipt of two guineas from the Royal Society for the Protection of Birds.

We are glad to see that Mr. G. W. Lamplugh, F.R.S., has been elected a Vice-President of the Geological Society. Professor W. W. Watts has been similarly honoured, his place as Secretary having been taken by Dr. A. Smith Woodward.

## REVIEWS AND BOOK NOTICES.

**Richmondshire**: an account of its History and Antiquities, Characters and Customs, Legendary Lore, and Natural History, by **Edmund Bogg**. Leeds: James Miles. 696 + xxiii. pp., price 7/6 net.

This is not a dear book, and doubtless many of the readers of this journal who have joined the rambles of the County Naturalists' Union in recent years, will welcome it. Amongst the 240 illustrations from photographs and drawings are many familiar places. Most of these are easily recognisable, though that labelled 'William Horne, F.G.S.' of Leyburn, sat in his 'bleeding' chair, would never have been identified were it not for the name given. The first chapter is 'A Geological Sketch of Richmondshire,' by the Rev. J. C. Fowler. With him, we agree that 'it is difficult in a few



**The Lady's Slipper Orchis.**

pages, to give an adequate outline of such a wide and broken district of hill and dale as Richmondshire,' and in his 6½ pages (including illustrations), he has not done justice to the subject. So 'sketchy' is this 'brief sketch' that it would have been better omitted. There is a 'Pterodactyl (chalk)' figured, a 'Carboniferous' ammonite, etc. We are not quite sure what is meant by the sentence—'the causes of the Glacial phenomena are in theory and various, one of the latest ideas being that the sun is a variable star.'

There are two 'Botanical Sketches' (of 'Richmondshire' and 'Wensleydale' respectively), by F. Arnold Lees. These are all that can be desired, are written in a pleasant style, and, of course, are most reliable. The description of the lady's slipper orchis is not accompanied by quite the number of adjectives that we should have expected from this enthusiast! An excellent illustration is given of the specimen gathered in 1907, which we are kindly permitted to reproduce. These botanical notes, together with the geological chapter already referred to, seem to comprise the 'natural history' section of the volume. Mr. Bogg's own work is in his familiar style. He has obviously well traversed the ground he describes; he has also consulted the literature dealing with the places he refers to, and thus gives a pretty full account of the attractions of Richmondshire and its borders. Now and then the 'yarns' which are included in order to give the work an interest, seem almost to have been 'dragged in'; but they are pardonable.

In their 'English Literature for Secondary Schools' Series, Messrs. MacMillan and Co. have recently published '**Selections from White's Natural History of Selborne**,' under the Editorship of T. A. Brunton, M.A., of the Manchester Grammar School (136 pp., cloth, 1/-). The book contains thirty of White's letters, which are illustrated by blocks from photographs by T. A. Metcalfe and others. Such volumes as this should do much to increase an interest in Nature amongst the scholars in our secondary schools.

**Richard Jefferies: His Life and Work**, by Edward Thomas. Hutchinson & Co. 340 pp., 10/- net.

Notwithstanding the fact that other writers have referred to Richard Jefferies and his work, we think the present volume, by Mr. Thomas, occupies a place quite apart from the others. It is most welcome. The author is a sympathetic and appreciative follower of Jefferies, and seems to have quite grasped Jefferies' feelings and sentiments. He has lived, too, for over twenty years in that part of Wiltshire that Jefferies knew so well; and from the country people there has gathered much interesting information relating to Jefferies and his family. From Mr. Thomas's previous publications, notably 'The Book of the Open Air,' already referred to in these columns, he is evidently the right man as Jefferies' biographer. He deals at some length with the ancestry, childhood, youth and earlier life of his subject, and then in turn deals with his first novels, first country essays, first country books, etc. There is an excellent bibliography, and the volume is illustrated by reproductions of portraits, a facsimile letter, etc. To read Mr. Thomas's volume is a pleasure, and results, if possible, in appreciating Jefferies' works even more.

We have received No. 8 of **Orkney and Shetland Old-Lore** (The King's Weigh House, Thomas Street, Grosvenor Square, London), an admirable publication; which we recently referred to in these columns. It deals with several matters of interest to antiquaries and folk-lorists. To shew that the publication is by no means 'dry,' we give an extract from a paper on 'Orkney Dialect,' which we think our readers will be able to follow:—*Twa feuly ald Orkna billies tullzied aboot a peerie uddie bit o' a plantacreu an' hed a laa plea ower 'id i' the Coort o' Session. The ane 'at waas soomoned gaed bae mistak till the tither's laaweer. Da scoondrel waas ower ceeval an' telt da man 'at he waas wirkan for da tither, bit wad gae 'im a letter intradeusan 'im tae anither honest (?) aaweer 'at wad be blide tae tak ap 'is case. Da man set awa wi' da letter, bit on 'is wey he thou't he wad hae a leuk at her jeust for a' the warl as gin he'd been a ald wife. The letter waasna lang bit sheu waas tae the point, for sheu jeust said: 'Twa Orkna fat geese; pluck thu the ane an' I'se pluck the ither.' Bae me singan certy dat billy got siccan a gluff dat he gaed straight tae the tither ane an' dey settled da ploy between themselves baith an' hed a foy ower id.'*

**A Monograph of the British Desmidiaceæ**, by **W. West, F.L.S.**, and **G. S. West, M.A., F.L.S., A.R.C.S.** Vol. III. Ray Society. 274 pp., 31 plates, price 25/- net.

The third volume of this useful work has appeared, and is devoted entirely to the genus *Cosmarium*, of which fifty species, and a number of varieties were figured and described in the second volume. To these the present volume adds 174 additional species, with a considerable number of varieties. From some remarks in the introduction (Vol. I.), in which the authors suggested that the genus *Cosmarium* might some day have to be split up into smaller genera, one may infer that they feel this number to be out of all proportion to its importance, and in this we are disposed to agree, though we think there may be some difference of opinion as to the suggested remedy. A careful examination of the descriptions and plates of this genus does not encourage the idea of finding sound grounds for generic differences, but rather suggests that even for specific and varietal discrimination, the most has been made of some minute points of difference.

The author says (page 128) 'We are gradually arriving at the conviction that external form is the dominating factor in the determination of the species groups in Desmids.' Along side this extract, we quote from the description of *Cosmarium regnesi* (Plate 78)—'the new semi-cells regain the more pronounced character of the species after having partially lost it by repeated divisions.' This appears to be an admission that the external form is liable to mutation at different periods of its life history.

It is evident that every fresh form that is described as a new species does, as a matter of fact, something to bridge over the differences between certain other species, and as this process is continually going on, a time will inevitably come when it will be necessary to recognise that the number of real species is very limited, and that much simplification of the study of this genus may be obtained by a judicious process of 'lumping.'

But before this can be undertaken successfully, there remains much work to be done in watching the growth and development of many of the forms. In many cases we notice Messrs. West add the significant remark—'Zygospore unknown.' Perhaps some of our local students of the fresh water Algae will take the hint, for in Yorkshire, notably in the moorland districts of the West and North Ridings, we have a very considerable Desmid Flora.

Of the plates accompanying the present volume, it is sufficient to say that they fully maintain the clearness and delicacy which are such marked characteristics of the previous volumes. We notice nothing is said as to any further issue, but, judging by the extent of ground already covered, and the genera that have not yet been described, one may presume that another volume (or perhaps two) will appear in due course. R. H. P.

We have received from Messrs. J. M. Dent & Co., the first part of '**Trees and Shrubs of the British Isles, Native and Acclimatised**,' by **C. S. Cooper and W. P. Westell**, and coloured and 'black and white' plates from drawings by C. F. Newell. The work is to be completed in sixteen parts at 1/- net each. The frontispiece is a coloured representation of the Strawberry tree; and there are a number of 'black and white' plates, shewing the structures of leaves, etc.; the drawing of some of which might be improved. With each species is given a description of its distribution, flowers, leaves, etc. We cannot find any new features in the work, but when complete, it will form a large, attractive and cheap volume.

We have received the **Records of Meteorological Observations** taken at the Observatory, Edgbaston, 1908, by **Alfred Cresswell**. It is issued by the Birmingham and Midland Institute Scientific Society, is sold at two shillings; and whilst it is not a pamphlet that will be read from cover to cover, it certainly contains a very valuable record of systematic observations. The pity is that similar publications are not issued from many other districts.

## NORTHERN NEWS.

The price of 'The Country Side' has been doubled.

A contemporary sends an 'invitation to our blind readers.'

A photograph of 'A Tame Wild Squirrel' appears in a contemporary.

We are glad to see from several West Riding newspapers that credit is due to the Crosshills Naturalists' Society 'for discovering the lesser shrew on the edge of Rombalds Moor, last records of *such a bird* going back about twenty years.'

In Memoriam. 'The Naturalists' Quarterly Review' (Dartford), referred to in these columns in anything but affectionate terms, closed its career with its eighth number. Its loss is mourned by the publisher and Mr. P. W. Westell. No flowers. R. I. P.

We notice from 'The Museum News' that Mr. F. A. Lucas is to give a lecture at the Brooklyn Institute on 'The Coming Extermination of the Elephant.' We hope the forthcoming big-game hunt of the ex-president of the United States is not to be quite so serious.

We are glad to see from a report of a recent lecture in Leeds, that 'the lecture was followed by a large number of exhibits of foraminifera and polycystina of species of a genus or of examples of Geneva, so that the members might get an understanding of how, with inheritance, variation invariably follows.'

In the *Eastern Morning News* of March 8th, the 'Discovery of a New Elephant' is announced as having been made in Japan. 'It occurs as small yellow or red crystals,' and 'has been appropriately named Nipporium. Its symbol will be Np., and its atomic weight has been ascertained to be probably 100. Evidently 'Nipporium' is Latin for 'Little Nipper.'

Lady Isabel Browne contributes an exceedingly valuable paper on 'The Phylogeny and Inter-relationships of the Pteridophyta' to the 'New Phytologist,' part VII. of which appears in the February issue. That it is not meant for the 'man (or woman) in the street' is obvious from the two following sentences taken at random in this lengthy paper:—'A similar shifting in other directions might have brought about the adaxial position of the Sphenophyllaceous sporangiophore, or having produced a marginal and abaxial position of the sorus from an adaxial position. If Mr. Tansley is right in regarding the branching of the frond of many Botryopteridæ in more than one plane as a vestige of a primitively radial construction the branching of the Sporophylls of some Sphenophyllales in the dorsiventral and lateral planes may be an indication of primitively radial symmetry.'

From the Lancashire newspapers we learn that 'a unique fossil' has recently been found in South Lancashire. At the meeting of the Manchester Geological and Mining Society, recently, Mr. Alfred J. Tonge exhibited a portion of the impression of a fossil tree which has been found in the Chequerbent Arley Mine of the Hulton Collieries, at a depth of 250 yards from the surface. 'It is remarkable,' Mr. Tonge said, 'from the fact that the tree has been traced for a length of 115 feet. It is a lepidodendron. It is lying in the bossy shales about three feet above the Arley seam, and is of flattened ovate form. The measurement, taken at a distance of 14 feet from the root end, gives a width across at that point of 2 feet 10 inches or measured along the circumference of the bark a little over 3 feet. The Chairman said the specimen seemed to be unique on account of its length and slenderness. It was characteristic of this kind of fossil for the bark to be preserved when the woody portion of the tree had disappeared. *It was so with the first fossil remains of an animal found by Sir Charles Lyell!*'



# THE NATURALIST.

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## NOTES AND COMMENTS.

### SPEETON AND SOUTH AFRICA.

We have recently received Vol. VII., Part 2 of the Annals of the South African Museum, which is devoted to 'Descriptions of the Palæontological Material collected by the Members of the Geological Survey of Cape Colony and others,' and contains an elaborate paper on 'The Invertebrate Fauna and Palæontological Relations of the Uitenhage Series,' by Dr. F. L. Kitchin.\* On glancing at the plates at the end of the volume, the striking resemblance with the fossils of the Speeton series is at once observed. Dr. Kitchin, in his remarkably full and critical review of the various memoirs dealing with the Uitenhage series, rejects the theories of the Liassic and Jurassic age of the beds, and brings forward very good evidence to shew that they are of Lower Cretaceous age, justly advocating that the evidence of the Cephalopoda must carry the greatest weight in arriving at a decision. The author then discusses the evidence afforded by each individual species, and unquestionably makes out a very good case. He is also very much up-to-date with regard to the literature of the subject, and has even drawn upon specimens from Yorkshire museums and private collections in working up his case. In this connection it is remarkable to find, for instance, that *Holcostephanus atherstoni* of Sharpe, from South Africa, is practically identical with the *Olcostephanus (Astieria) asteria* described by Mr. C. G. Danford in the Yorkshire Geological Society's Proceedings for 1906, (publ. 1907). To find this extraordinary similarity between specimens occurring in so widely divided districts as Yorkshire and South Africa is certainly surprising. In conclusion, we should like to take this opportunity of congratulating Dr. Kitchin upon the thoroughness with which he has prepared this important contribution to palæontology.

### AFRICAN FUNGI.

Mr. W. N. Cheesman, F.L.S., of Selby, who joined the British Association at South Africa in 1905, made an extensive collection of fungi. This included no fewer than twenty-five new to the flora of Africa, one being new to science. In the Linnean Society's Journal for February 1909, Mr. Cheesman describes these finds, and in the same publication Mr. Thomas Gibbs gives a Note on the Coprophilous fungi, in which he describes the new species under the name of *Coprinus cheesmani*.

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\* West, Newman & Co., London. pp. 12-250, plates, price 12/6.

## SEEDS FROM PEAT.

From the same journal we have received a reprint of a useful paper 'On a Method of Disintegrating Peat and other Deposits containing Fossil Seeds,' by Mrs. E. M. Reid, B.Sc. The excellent work accomplished by Mr. Clement Reid, F.R.S., and Mrs. Reid is well known; hence the present contribution is most welcome. It has been found that by boiling peat with about equal quantities of dehydrated soda, it becomes quite disintegrated, and the most fragile of seeds and other plant remains are uninjured. In this way specimens of peat from Hornsea, Bielsbeck, Kirmington and other places, which formerly were quite intractable, have been made to yield a large series of plant seeds, etc.

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In 'Man' for March, Mr. J. R. Mortimer contributes a note on 'The Stature and Cephalic Index of the Pre-historic Men, whose Remains are preserved in the Mortimer Museum, Driffeld.' In this he shews that the early long-headed, or dolichocephalic individuals were an inch taller than the round-headed or brachycephalic individuals.

**Who were the Romans**, by Prof. William Ridgeway, is the title of a clever essay published by the British Academy (Oxford University Press, 44 pp., 2/6.) In it Prof. Ridgeway shews that the old idea that the Romans were an homogeneous people, there being no ethnical distinction between Patricians and Plebians has, at any rate, the advantage of simplicity; but as in so many problems of natural science, so in history does it often occur that the more the matter is probed, the more complicated it becomes. In his characteristically masterly manner, the author gives an account of the early occupants of the Mediterranean region, and traces their growth and change as time went on.

**The Care of Natural Monuments**, by H. Conwentz. Cambridge University Press. 185 pp. 2/6 net. This is a further contribution to the subject dealt with by Prof. Baldwin Brown, in his book on 'The Care of Ancient Monuments,' which was noticed in these columns when it was published. The present volume is the outcome of a paper read by Mr. Conwentz at the Leicester meeting of the British Association, and deals with the preservation of all manner of natural features, giving special reference to the methods in vogue in England and Germany. Evidently they look after these things well in Germany. A collector of a large number of specimens of the Lady's Slipper Orchis has there been sentenced to a fortnight's imprisonment, notwithstanding that he had not been previously convicted. The question of publishing 'distribution' maps, etc. is also discussed, and it is pointed out that soon after the publication of a map shewing the nesting sites of rare birds, dealers flocked there in search of eggs. A graceful tribute is paid to the work of the Yorkshire Naturalists' Union, and the methods it adopts for preserving the fauna and flora, and of recording the physical features of the county. A word of praise is also meted out in favour of the authors of the maps and memoirs dealing with botanical survey; in which work Yorkshire has taken an active part. Mr. Conwentz regards these as 'a standard of voluntary work, which has not been attained in any other country.' The book concludes with the quotation from Shakespeare—'who is here so vile that will not love his country.' Quite so, but there must be many such, or all the legislation would not be needed.

## THE PRESENT STATE OF OUR KNOWLEDGE OF CARBONIFEROUS GEOLOGY.

DR. WHEELTON HIND, F.R.C.S., F.G.S.

(Continued from page 156).

The whole fauna of the Yoredale Series is a Carboniferous Limestone fauna, and not a Pendleside fauna. This question of the relation of the Yoredale Series to the Pendleside Series is one of the greatest importance, and one that I believe work in this county of Yorkshire alone will settle.

To understand this matter, a correct conception of the Yoredale phase of Carboniferous Limestone deposit is essential. In the Midland province the Carboniferous Limestone is practically one mass, but as the beds pass North, the limestones are in part replaced by intercalations of shales and sandstones, and this replacement at the expense of the limestone increases as the Series is traced North; that is to say beds of detrital material are substituted for organic, and this change indicates the influence of land whence were derived the grits and muds which separate the limestones.

How far the *Seminula* beds, which lie under Ingleboro, can be traced North is a question for future investigation, but Prof. Garwood has shewn that *Seminula* beds exist at the base of the Carboniferous Limestone Series at Arnside and Kendal, and Mr. Cosmo Johns that a small patch of probably Tournaisian beds is preserved in Pinskey Gill in Ravenstonedale.

### NORTHUMBERLAND.

I believe work is now being carried on in Northumberland which will settle the sequence there. At any rate, in Durham and Northumberland a *Dibunophyllum* fauna extends right up to the Millstone Grit of that area.

*Dibunophyllum*, *Cyclophyllum*, *Lonsdaleia*, and other Corals are found in abundance in the Main Limestone of that district, together with a rich Visean fauna, and there can be no doubt that the whole Yoredale phase of the area is typically Upper *Dibunophyllum*.

The Northumbrian sequence of Carboniferous rocks differs considerably from those which obtain further south. I quote Prof. Lebour's account given in the appendix of his handbook on 'The Geology and Natural History of Northumberland

and Durham, and the Memoirs of the Geological Survey on Parts of Northumberland,' which, though not based on palæontological lines, will serve to shew the lithological succession:—

CALCAREOUS SERIES.

Fell Top or Upper Calcareous division (From Millstone Grit to horizon of Great Limestone) 350-1200 feet.

Calcareous division from the Base of the Great Limestone to the bottom of the Dun or Redesdale Limestone inclusive, 1300-2500 feet.

SCREMERSTON.

Carbonaceous Division.—From the Dun Limestone to the top of the Tweedian Grits, 800-2500 feet.

TWEEDIAN.

Fell Sandstones.

Cement Stone Beds and Rothbury Limestones.

Lower Freestones.

Basement Bed in all from 1000-5100 feet.

One immense change has taken place with regard to the lower part of the Series, Calcareous deposits being almost entirely replaced by detrital sediments, in which marine fossils are rare. A second, not shewn in the scheme, is the number of seams of coal which are found through the series.

The division into Calcareous and Carbonaceous is convenient only, but it has no palæontological basis. The whole of the Calcareous Series I consider belongs to the Upper *Dibunophyllum* zone, together with possibly all but certainly the greater portion of the Scremerston or Carbonaceous division. In the Memoir of the Geological Survey on Berwick-on-Tweed, Mr. Gunn stated (p. 17), that the total thickness of the Calcareous division down to the Dun or Redesdale Limestone is 1500 feet. There must therefore be a very great expansion of the *Dibunophyllum* zone in this area. Probably, however, owing to the detrital nature of the deposit and the relative paucity of limestone, deposition took place at a much quicker rate than in areas receiving mainly a pure calcareous or organic deposit.

The various memoirs of the Geological Survey give lists of fossils from the various divisions of the Carboniferous rocks in Northumberland. The list in 'The Geology of Plashetts and Kielder,' p. 12-15 of the Carboniferous Series is without doubt characteristic of *Dibunophyllum* fauna, and no other.

The figures I have quoted as representing the thicknesses of each sub-division are those given by Prof. Lebour (Op. supra cit.), so that the *Dibunophyllum* zone, most of which is the upper sub-division, has an extent of from 1650-3700 feet throughout which *Productus giganteus* ranges.

The question of the homotaxial equivalent of the Tuedian group will be more difficult to settle. They have a great affinity lithologically, and palæontologically, with the Carboniferous Sandstone Series of the East of Scotland, of which the plant remains give very valuable evidence, but those groups of fossils on which at the present time we rely as zonal indexes for the Limestone are practically absent, owing to the nature of the deposit. But having determined the horizon of the lowest coral and brachiopod bearing limestone, it will not be impossible to assume the relative age of sandstone which immediately underlies it.

### EAST OF SCOTLAND.

The Lower Carboniferous succession of the East of Scotland, consists of the following members :—

#### CARBONIFEROUS LIMESTONE SERIES.

Upper Limestone group

Coal-bearing group.

Lower Limestone group.

#### CALCIFEROUS SANDSTONE SERIES.

Burdiehouse Limestone group.

Cement Stone group.

The succession and palæontology of these beds have been well worked out, and the results published in the Memoirs of the Geological Survey of Scotland ; the Geology of East Fife ; and Central and Western Fife and Kinrossshire.

The Hurler Limestone is taken as the base of the Carboniferous Limestone Series, and its fauna is certainly that of the Upper *Dibunophyllum* zone. Consequently some portion of the Calciferous Sandstone Series must be of Lower *Dibunophyllum* age, and this bears out the contentions of the late J. G. Goodchild, that a good deal of this Calciferous Sandstone Series was the homotaxial equivalent of the Carboniferous Limestone further South.

On consulting the memoirs mentioned above, it will be noted that the Calciferous Sandstone is much more fossiliferous in the East of Fife than in the West, and the marine character of the deposits more pronounced.

### WEST OF SCOTLAND.

The Liddesdale and Eskdale beds are interesting, and yield a lamellibranch fauna which I consider low. But further than this I am not prepared to dogmatise at present.

In the West of Scotland the succession is somewhat similar but the Calciferous Sandstone Series is much less obvious, its deposition having been interfered with by volcanic outbursts. No marine organisms have been found in them, the only finds that have been obtained are remains of plants, ostracods and fish.

The Lower Limestone Series is very rich in fossils, and especially so in Corals and Brachiopoda.

The fauna has been diligently collected over the whole area, by several geologists, and most groups have been submitted to specialists, and it may be said that the distribution of the Carboniferous fauna of the West of Scotland is well known. As in the East, there is a Lower Limestone Series separated from an Upper Limestone Series, by a coal and ironstone-bearing Group, and that the Lower Limestone Series is characterised by a fauna typical of the Upper *Dibunophyllum* zone.

The fauna, also, in a somewhat more limited extent, is found in the Upper Limestone Series. For example, the Lower Carboniferous fish fauna passes up into the Upper Limestone Series, and then comes the change, and the upper fish fauna is found in the Millstone Grits and Coal Measures.

The Cephalopod fauna of the Upper Limestone Series calls for special remark. In the list compiled for the handbook of the British Association for the Glasgow Meeting, Mr. J. Neilson records the presence at Gare of several Goniatites, which in the Midlands are associated only with the Pendleside Series, such as *Glyphioceras reticulatum*, *G. striatum*, *G. vesica* and from both Upper and Lower Limestone Series of *G. diadema* and *Dimorphocheus gilbertsoni* from shale over the Hosie Limestone at Thornton.

*Productus giganteus* and a large number of Brachiopoda pass up into the Upper Limestone Series, but corals are much less frequent.

The interesting Cephalopod, *Pleuromitella nodosocarinatus* occurs in the Upper Limestone Series. This is a rare fossil, and has a limited range in the Midlands, at the upper part of the Pendleside Series and Millstone Grit. It has also been found in the Yoredale series of Swaledale.

Some 680 hundred feet of Grits, Sandstones, Fireclays with their coals, ironstones, and limestones, intervene between the Castle Cary, on the uppermost limestone of the Upper



Limestone Series, and the base of the Coal Measures, except in Ayrshire, where the Coal Measures rest on the Carboniferous Limestone. There is evidence elsewhere of volcanic activity at this horizon. It is in this Millstone Grit Series that the great change takes place from the Lower to the Upper Carboniferous flora, and about this horizon has recently been found, by Mr. D. Tait, of the Geological Survey, an interesting lamellibranch fauna, which I have described in the 'Transactions of the Royal Society, Edinburgh.'\* The important fact revealed by this fauna is its relation to the fauna of the Coal Measures of Nebraska, U.S.A., and till this discovery, most of the specimens had not been previously recognised in Western Europe. This fauna has been traced through several counties in Scotland. Since publication, one or two species have occurred in the millstone grits of the Midlands.

#### ISLE OF MAN.

I have shewn that the Carboniferous succession in the Isle of Man † is to be referred to a few hundred feet of the Upper *Dibunophyllum* zone, and the base of the Pendleside Series. The sequence is very similar to that which obtains in the Midlands. The Poolvash Limestones and the black limestones of Scarlet, and the black marble quarry and their faunas can be well matched by examples from Derbyshire, Staffordshire and Yorkshire.

#### IRELAND.

Very excellent work has been done by Drs. Matley and Vaughan on the Carboniferous Series exposed from Rush to Loughshinny. Their latest views are that the whole Series represent *Dibunophyllum* beds, *Cyathaxonia*, and the Pendleside Series as high up as the horizon of *Glyphioceras spirale*.‡ The palæontological reasons for this view are given at length; but in addition, the thicknesses of the Series, 1110 feet, strongly favours the correctness of this interpretation.

No work on definite zonal lines has been carried out in the south-west of Ireland, but certain facts are known. *Prolecanites compressus*, the fossil which characterises the uppermost

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\* Vol. XLVI., Part II., 15.

† 'Trans. Yorkshire Geol. Soc.', Vol. XXI., pt. 2, pp. 157-154.

‡ Q. J. Geol. Soc., Vol. XLIV., p. 434.

beds of the *Cyathaxonia* beds and the lowest bed of the Pendleside Series, is found high up in a pure limestone, with a Viséan fauna at Little Island, Co. Cork. In Calcareous shales at Old Head of Kinsale, *Posidonomya becheri* occurs in abundance.

Similarly all through the West of Ireland, limestones with a high Viséan fauna are succeeded by beds with a typical Pendleside fauna. Good sequences are to be seen at Foynes Island, Lisdoonvarna, Cliffs of Moher, and in the neighbourhood of Ennis.\*

In the district of the Burren, in the North of Co. Clare, the whole of the Carboniferous Limestone Series is exposed in unbroken succession, and here it will be no very difficult task to make out the zonal horizons, though quarries are few, and the weathered surfaces will largely have to be relied upon to furnish the fossils. I believe the district is already under examination at the hands of competent geologists.

Probably in Tyrone and at Cultra, Co. Down, beds very low down in the Carboniferous Series occur, characterised by *Modiola Macadamii*, but these areas require reinvestigating with our present knowledge of the distribution of Carboniferous Corals.

### THE CULM.

In North Devonshire occur a Series of Carboniferous beds, known as the Culm. The district has been mapped and described by Mr. Ussher. Mr. Newell Arber has published papers dealing with portions of the Series from a standpoint of the flora and fauna respectively, and Messrs. J. G. Hamling and Inkerman Rogers have collected most carefully from the various horizons exposed.

Apparently resting on Upper Devonian rocks from which specimens have lately been obtained by Mr. Hamling, doubtfully referred to *Clymenia*, are a series of Cherty beds and Radiolarian Limestones, known locally as the Coddan Hill beds. These contain the following fauna :—

#### TRILOBITES.

<i>Phillipsia leei.</i>	<i>Griffithides acanthiceps.</i>
„ <i>minor.</i>	„ <i>longispinus.</i>
„ <i>cliffordi.</i>	<i>Proetus</i> Sp.
„ <i>polleni.</i>	

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\* Hind, 'Proc. Roy. Inst. Acad.', Vol. XXV., Sept. 13, No. 4.

## CORALS.

<i>Palæacis humilis.</i>		<i>Pleurodictyum decheanum.</i>
<i>Zaphrentis</i> cf. <i>Z. enniskilleni.</i>		

## CEPHALOPODA.

<i>Prolecanites compressus.</i>		<i>Nomismoceras spirorbis.</i>
„ <i>mixolobus.</i>		<i>Pericyclus</i> sp.

## LAMELLIBRANCHIATA.

*Chænocardiola footii.*

## BRACHIOPODA.

<i>Chonetes</i> cf. <i>laguessiana.</i>		<i>Productus plicatus</i> Sarres.
and many Radiolarians.		

These beds are succeeded by black shales and limestones at Venn, which are crammed with *Posidonomya becheri*. The fauna they contain is sparse in species, and is as follows:—

<i>Posidonomya becheri.</i>		<i>Glyphioceras striatum.</i>
<i>Pseudamustum fibrillosum.</i>		„ <i>sphæricum.</i>
<i>Glyphioceras spirale</i> (upper part)		<i>Orthoceras cylindraceum.</i>
„ <i>crenistria.</i>		

and plant remains.

These limestones are succeeded by the Middle Culm Grits, which contain plant remains. Above them comes a most interesting series of beds, best seen on the shore at Instow and near Clovelly, which contain concretions which yield the following fauna:—

<i>Pterinopecten papyraceus.</i>		<i>Dimorphoceras gilbertsoni.</i>
<i>Posidoniella lævis.</i>		<i>Orthoceras</i> sp.
<i>Gastrioceras listeri.</i>		<i>Cælacanthus elegans.</i>
„ <i>carbonarium.</i>		<i>Elonichthys aitkeni.</i>

A fauna with the distinct facies of the Lower Coal Measures of Lancashire: and above this are the beds known as Upper Culm, which contain a typical Coal Measure Flora and Fauna *Carbonicola acuta* and *C. aquilina*.

The fauna here demonstrates a succession beginning with the Coddon Hill beds, with zone fossils indicating these to be the homotaxial equivalent of the Pendleside Series of the Midlands, and passing up into Coal Measures, where, unfortunately, coals are conspicuously absent, and only represented by the beds of Culm, which were once worked for painters material.

In the South of Devonshire, and passing West from Exeter to Cornwall, that portion of the Culm Series characterised by *Glyphioceras spirale* is present. The Coddon Hill or *Prolecanites compressus* beds appear to be present, and to be cherty in character, and are characterised by the presence of *Glyphioceras*

*sphaericum* and *Posidonomya becheri*.\* I have seen the following species from Doddiscombeleigh :—

<i>Glyphioceras reticulatum.</i>		<i>Seminula ambigua.</i>
<i>Stroboceras sulcatum.</i>		A Rhynchonellid.
<i>Posidonomya becheri.</i>		

Mr. Ussher states † :—‘ As regards the relative position of the Codden Hill beds and *Posidonomya* Limestones and Shales, ‘wherever these two types are recognisable on the North or South Crop, the Limestone Series is invariably the uppermost.’ *Glyphioceras spirale* is a common fossil in the upper beds of the Lower Culm (*Posidonomya* beds) at Bampton, Waddon-Barton and elsewhere, both in the Northern and Southern crops.

### SOUTH WALES.

At Bishopton in the Gower peninsula is a most typical sequence—the *Dibunophyllum* beds of the phases D2 and D3, the latter being represented by the dark limestones and shales of Oystermouth Castle. On these rest the Bishopton beds, consisting of a Series of cherty beds passing up into Black Shales with *Posidoniella laevis* and *Glyphioceras bilingue*. I think it probable that the cherts may represent in part the Codden Hill beds, but there seems to be a gap of the higher Series from the zones *Posidonomya becheri* to the incoming of the *Glyphioceras bilingue* beds, probably not any very great thickness of beds, but the zones here afford evidence of a local unconformity. Mr. I. Rogers has discovered *Glyphioceras reticulatum* in the Culm, near Barnstaple, so that the following life zones all occur in the Culm of Devonshire :—

*Gastrioceras listeri.*  
*Glyphioceras reticulatum.*  
*Glyphioceras spirale.*  
*Posidonomya becheri.*  
*Prolecanites compressus.*

And there can be little doubt that the Culm of the South-west, and the Pendleside Series of Co. Clare and the Midlands are homotaxial equivalents. This view is amply borne out on examining the Carboniferous succession in Belgium and Germany, where the Namurien and Culm are characterised by a fauna and flora identical with that of the Pendleside Series.

\* Mem. Geol. Sur. England and Wales; ‘The Geology of Country round Exeter,’ p. 9.

† The Geology of the Quantock Hills, and of Taunton and Bridgewater, p. 25.

(To be continued).

## THRUSH STONES AND *HELIX* *NEMORALIS* L.

E. ADRIAN WOODRUFFE-PEACOCK, F.L.S., F.G.S.

THRUSH stones have interested me from my childhood onward, and I have collected tens of thousands of broken shells from them at various times. Sometimes thousands of shells may be found at a single anvil, on peat, fresh-water or estuarine alluvium, for stones or bricks are rare on such soils. They have always to be carried to the spots where the birds find them by man. When they are most pressed for animal food in severe winters or dry springs, the thrushes are not backward in finding fair substitutes for hard stones for anvils. The beck of the incline towards the great fenland, and of our smaller valleys, freeze, thaw partly, break up into floes, jam, and freeze again, presenting irregularities of surface, which the birds are quick enough to turn to good use. A stone standing slightly above the road or footpath level, the lowest bars of gates, the sharp points of low-set barbed-wire, or even 'the stubs' in a laid fence are not forgotten when other means fail them.

The whole subject is interesting, but does not give any approximate scientific results, until a fairly simple and ready field-method of recording the relationship of the banding to the interspacing on the shells is brought into use. When an elastic formula is found, the *nexus* between the shells of a given spot, their environment, and the thrushes is partly disclosed, and becomes explicable. Any method of recording to be of true use must be sufficiently simple to be applied, not only to specimens in collections, but at once in the field to the living molluscs. If it is too complicated, the relationship between the supply of shells on a given spot and those that are badly protected for want of banding, or by limited banding, and so are easily discovered by the birds, cannot be worked out.

When a long series of *H. nemoralis* is brought together from one place and is examined critically, it will be discovered that there is a common relationship and law of banding and interspacing prevalent among these local specimens. It has also a distinct relationship to their former environment. For instance, the form 12045 of the old notation, may be met with for 200 yards on *one* side of a stream and then be absent for miles, till it is picked up again, and is discovered to have a

similar range on the bank of another stream. Personally, I have never taken this form anywhere except by flowing water.

Again, when the forms of banding of various soils and localities are brought together and are compared, the general banding law of the species is clearly seen. For *H. nemoralis*, it is most usefully stated in a formula, as 112234425, which notes both the banding and inter-spacing widths. In these figures, reading from left to right, the first, third, fifth, seventh and ninth indicate the bands, and their general normal width ; while the second, fourth, sixth, and eighth figures indicate the inter-spaces and their general normal width. In other words, the space between the upper side of the first band, and the lower side of the fifth band is divided into 24 imaginary band-spaces of equal width. As 24 is a number that can be divided by many other numbers without leaving a fraction, no other number about its size could be found equally useful. Even when the shells are not typical, such as the varieties *major* (Fér.), *minor* (Mog.), *compressa* (Terver.), or *conica* (Pascal), the formula applies.

In practical band and interspace recording in the field and study, I find it impossible to take off the banding formula of a shell in one long line as it is printed here. I used to write the typical formula down with the bands at wide distances, and below an imaginary line, the interspaces between them. Then I took the shell which I was about to record, and studied it to see which had the greater width, the fifth band or third interspace, and from this drew a criterion for the data of the shell ; writing its formula in the *same way* below that of the typical shell formula. I know it so well now, I have no occasion to write the type formula ; but that of the shell I still write in the same way, and strongly advise all analysts to do so. The eye is much helped by two lines of figures—one for the five bands, and one for the four interspaces, though they cannot be printed in that way conveniently. In reading off the printed formulæ, too, much assistance is gained by noting the central figure specially, which is always the third band record for every shell.

Specimens that are accurately represented by the type or any other *simple* formula are comparatively rare. So a practical method has to be discovered to show at a glance that the recorded bands and interspaces are wider or narrower than the width of the one twenty-fourth of the whole banding area.

This is quickly done by adding a colon after the figures that want less than one type-band increase, and a point after those that require diminishing to a like extent. By doubling or quadrupling the figures, a perfectly exact formula for any shell may be obtained. Difficulties of several kinds are met with by doing this, both in the field, and in clearness of recording, so in practice such formulæ are unworkable.

Three shells from a high hedge bank on sandy glacial gravel will illustrate at once this method and its flexibility. Here are their formulæ :— $1_1 2_2 2_5 (425)$ ,  $1_1.2_1.3:4_5 1_6$ , and  $1:1.2:2.1:6.5_1.5_1$ . There is nothing in anyway unusual about them. In the first shell the upper band was missing, and the lower ones confluent. Small figures always imply that the band and interspace, or the bands and interspaces, as the case may be, are absent, but that the space covered by them may be thus approximately accounted for. In the second shell, as their formula records them, the two first interspaces are too large, and the third band too small. The third shell is a more difficult task to take off correctly ; the fourth band alone is typical, all the other bands and interspaces require diacritical marks of increase or decrease. Along with these specimens two other shells were brought home from the Oxford clay of a dyke side. A *libellula* (Risso) + *conica* (Pascal) which read  $1.2_1.2_2:5_2:4_1.5$  ; and a *rubella* (Moq.) + *compressa* (Terver.) which read  $1_1 2_2 2_5 4_2 5$ , i.e., with a simple band formula.

With this fairly expeditious method—when it is fully mastered—the bands and interspaces of *H. nemoralis* from varying localities and soils can be formulated sufficiently accurately for practical scientific results. The law of their relationship to their environment, and of the frequency of the destruction of all forms can be worked out. Still more important, the evolutionary law ‘of the correlation of parts or characters’ can be discovered so far as the bands and interspaces are influenced by it. The sheets I use for recording purposes are three inches wide by three and three-quarters long. I make the most exact notes of locality, soil, water, etc., for everything seems to influence the banding and interspacing, i.e., the destruction of this species by thrushes. I keep the notes under soils, arranged in the order of their colour in the first place, then their varieties of form, and finally by the number of bands, ignoring the interspaces.

The commonest shell found at thrush stones is *libellula*

(Risso) unbanded. This is followed closely by three others in order :—112234425 to 112153425. Then come the specimens more 'lightly' banded on the upper side. The confluent type (112234425) is a fairly common shell at anvils on fresh-water alluvium, but the other form of it, where the bands show as deep black on a dark brown ground is rare. It is apparently the best protected form we have, for where it abounds it is not frequently taken. Confluent mouthed shells are more fully protected than plain banded ones. Soils and localities vary greatly in banding and interspacing formulæ ; and yet there is a strong family likeness in shells from one spot as we should naturally expect. So much is this the case that with sufficient notes on local shells, and a well-arranged register, I believe it would be quite possible to say from what soil, if the register were kept under localities, I could almost say from what spot, a given box, with a sufficient number of specimens, had been taken.

The following notes may be found useful. One method of reading off and recording the banding and interspacing must be followed. Turn the shell bottom upwards, in the dextral type with the mouth to the left hand. Draw an imaginary line from the point where the lip joins the body whorl, through the umbilicus round the shell, and read the banding and interspacing off along this line.

In every shell practically, unless some abnormality is found, the third band is always the longest, or approaches nearest to the lip. When the other four bands are absent, and the third band is abnormally developed, there is generally a point extending beyond the average length of this wide band toward the lip, approximately three twenty-fourths of the entire band space wide, indicating the position of the original third type band. Here is an instance. A 'dead' specimen of *rubella* (Moq.) 112162425, from road hedge side of pasture on sandy glacial gravel. Three interspace band widths beyond the normal had been covered, one above and two below, as the longer extending original third band indicated. On average shells, on the soils I have worked, the bands come in order of length towards the lip as follows :—34215. Exceptionally we find 32145 ; more rarely still some other order. The third band too, usually turns slightly down at the lip. When the two lower bands are confluent, there is generally a slight tendency to bend upwards, just before finishing, though the lip ending itself is generally in the normal line.

(To be continued).

Naturalist,



## PROCEEDINGS OF PROVINCIAL SCIENTIFIC SOCIETIES.

In recent years there has unquestionably been a great improvement in the character and contents of the publications of the various volumes issued by the different scientific societies in the provinces. There is a general improvement in the editing, greater care is being taken with regard to dating, etc., and what is of more importance, each society is more and more realizing the advantage of confining the scope of its papers to its own area. So long as this is borne in mind by the local societies, the disadvantages of so many publications will disappear. It is also gratifying to find that members of many of the societies are taking up hitherto neglected branches of study, *e.g.*, arachnida, fungi, etc., with good result.

**Journal of the Derbyshire Archæological and Natural History Society,** Vol. XXXI., 1909. 243 pp.+xviii pp.

Like its immediate predecessors, this volume reflects the greatest credit upon its editor, Mr. C. E. B. Bowles. It is a substantial production, devoid of padding, and whilst it contains many pages outside the scope of our journal, it also includes several valuable papers worthy of the attention of our readers. Mr. T. Gibbs continues his 'First List of Derbyshire Agarics'—a work much more valuable than the word 'list' would infer. Messrs. W. Storrs Fox and R. A. Smith give an excellent illustrated account of the Excavations and the Finds in the Harborough Cave, near Brassington; the Rev. F. C. R. Jourdain writes a 'Zoological Record for Derbyshire, 1908,' and the editor writes on 'Coal Raising in the Seventeenth Century.' Amongst the authors of the numerous archæological papers are some of our leading antiquaries.

**Transactions of the Vale of Derwent Naturalists' Field Club.** New Series. Vol. I., part 1, 1908. Rowlands Gill. 71 pp., 1/-.

This little volume is an indication that our friends in the Vale of Derwent are working on the right lines. In his presidential address, Mr. H. F. Bulman refers to neglected branches of study; there is a good record of Field Rambles by different members; Mr. R. S. Bagnall writes on 'Strangers Zoological' [chiefly Coleoptera]; 'The Bristle-tails (*Thysanura*) of the Derwent Valley' [with list]; Mr. A. R. Jackson gives 'A note on some rare Spiders from the Derwent Valley'; Messrs. Carleton Rea and M. C. Potter write on the Fungi of Gibside, with list; Mr. R. Adamson enumerates 'Our Local Orchids'; Mr. J. W. Fawcett gives a brief History of Chopwell; the Editor, Mr. C. L. Bagnall, contributes 'A Brief History of Winlinton'; and Mr. H. F. Bulman gives some Meteorological Notes.

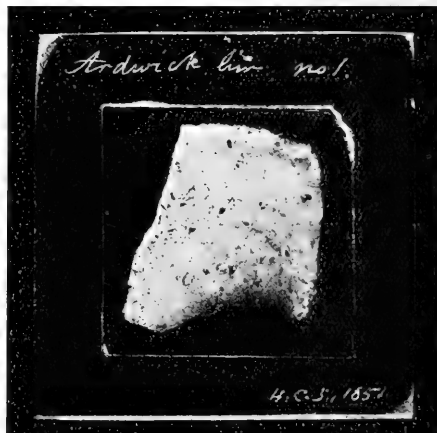
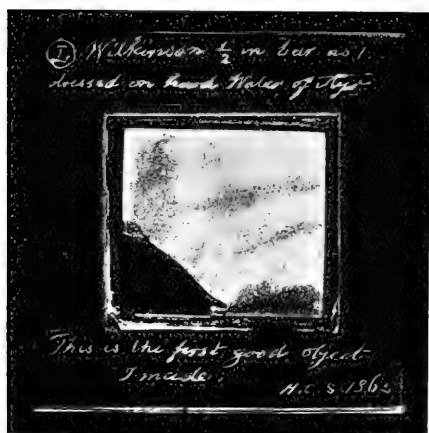
**The Recorders' Report for 1908 of the Bradford Natural History and Microscopical Society** (20 pp.) in an inexpensive manner provides a useful record of a year's work in the Bradford district. In addition to the usual interesting notes on Birds, etc., we are glad to see lists of Hymenoptera, Diptera, Isopods, Arachnida, etc. We notice the recorder for Vertebrate Zoology urges 'ye local ornithologists' to 'wake up,' though there is not much evidence of their being dormant. The contributors to this interesting report are Messrs. F. Jowett, M. Malone, J. Beanland, F. Rhodes, J. W. Carter, R. Butterfield, J. H. Ashworth, W. P. Winter, H. B. Booth and J. W. Tindle.

**The Proceedings of the Liverpool Naturalists' Field Club for 1908** are principally occupied with an account of the Club's Field Meetings during 1908 (chiefly botanical), but also contain the annual report, list of members, prize-winners, etc. The club has 166 members.

**The Transactions of the Leeds Geological Association, Part XIV.** (1905-8, published 1909, 71 pp. Leeds, 2/6) clearly indicate that the Leeds Geological Society at the present time is in a very flourishing condition. The membership is 112, 'a net increase of 27 over the previous session,' and both indoor and out-door meetings have been well attended. The present part of Transactions contains a good account of the Association's

work during the past three sessions, with abstracts of papers read, etc. Several of these have been printed to greater length elsewhere; some are now published for the first time, but all alike will be of interest to the members of the Leeds Society. Following these abstracts are usually suitable 'references,' though one or two of these (e.g., 'A Strachan, Q.J.G.S.'; 'Nordenskiöld.—'Geol. Mag.', and 'Gregory—"Nature"') seem rather vague. We cannot enumerate all the interesting notes here, but we were particularly glad to find a good summary of Prof. Kendall's 'Geological History of the North Sea Basin,' 'The Cleveland and North-East Yorkshire—The Influence of Soils on Vegetation,' and 'A Description of Six Sections in the Lower Coal Measures of Leeds,' by B. Holgate. This last is illustrated by six excellent plates from photographs by the President, Mr. F. W. Branson, who has also paid for the plates. There is an excellent record of the work accomplished on the Association's Excursions, which is not (though should be) signed; presumably it is the work of the Hon. Editor and Secretary, Mr. E. Hawkesworth. Another welcome feature is the 'Classified Index of the Transactions, Vols. I.—XIV.' This will be very useful, particularly to those who possess complete sets of the Transactions.

We don't know that anyone will be able to find much fault with the **Proceedings of the Yorkshire Geological Society for 1908.** It is a more than usually substantial volume; is exceptionally well illustrated; the date of publication is printed on the wrapper; and the dates the various papers were read and MSS. received, are given at the head of each. Prof. Kendal gives suitable obituary notices of the late H. Clifton Sorby and Joseph Lomas, the former of which is illustrated by photos and photomicrographs of Sorby's first slides; two of these we are kindly permitted to reproduce. Prof. McKenny Hughes contributes the sixth instalment of his paper on 'Ingleborough'; Mr. H. Culpin follows with a paper on 'The



Fossils in the Yorkshire Coal Measures above the Barnsley Seam'; some of his new finds being described by Dr. Wheelton Hind. One is called *Aviculopecten culpini*, in honour of its discoverer. Other papers bearing upon Carboniferous Geology are contributed by Messrs. H. St. John Durnford, A. Wilmore, A. R. Derryhouse, Cosmo Johns and Walter Rowley. Mr. F. Elgee writes on 'The Glaciation of North Cleveland,' and Mr. A. Gilligan on 'Some Effects of the Storm of June 3rd, 1908.' The only thing we cannot quite understand in the whole volume is how

the very third-rate block on plate XLVI., with its extraordinary description, managed to squeeze its way in between the very fine illustration of Corals, by Dr. Dwerryhouse, without being chipped by the Editor's geological hammer.

The Fifty-sixth **Annual Report and Transactions of the Nottingham Naturalists' Society** for 1907-8, was issued on February 19th, 1909. It contains a well-illustrated presidential address on 'Adaptation,' by J. Golding. Prof. J. W. Carr records *Selinium Carvifolia* for the first time in Nottinghamshire, the plant being first discovered as British in 1880, at Broughton Wood, Lincs.; and there are two pages of short notes on Nottingham birds, mammals, flowering plants, hepaticæ and fungi. Some of the botanical records are new to the county.

No. 19 of the **Bradford Scientific Journal**, for January, 1909, has appeared, and besides containing the reports of the Bradford Natural History and Microscopical Society, referred to elsewhere, has a further instalment of Mr. S. Margerison's notes 'On the Vegetation of some Disused quarries,' an interesting 'Note on the Cockchafer,' by Mr. W. P. Winter, and an account of an 'Exploration' of Mounds near Cullingworth. From the description given we are inclined to agree with the opinions of 'several practical men' who have seen them and pronounce them to be quarries. The only mound that yielded any 'relics' contained pieces of a pipe stem, and we agree with Dr. Viley that from this evidence 'it is fairly clear that the work was not pre-historic.'

The **Seventy-fifth Annual Report of Bootham School (York) Natural History Society** (32 pp.), is an excellent record of an excellent year's work. In all branches (with the possible exception of geology), there seems to have been a steady desire for useful work, and the sectional reports are most encouraging. There are also accounts of the School's exhibit at the Franco-British Exhibition, and its Christmas Exhibition, both of which were highly successful. Instead of a list of rare eggs collected, we are glad to notice the more innocent 'oology has also prospered!' For some unrecorded crime we notice that one youth is advised to '*stick to insects!*'

The **Eighty-sixth Annual Report of the Whitby Literary and Philosophical Society** records a year of steady progress. More footprints have been secured by Mr. Brodrick, who read 'a most satisfactory paper on the whole subject before the British Association.' Mr. Buckman is examining the Liassic fossils in the collection, and doubtless good will result. A long-tailed duck, 'the first of its species ever taken in Whitby,' was secured in November last, and is now in the Museum. The Report also contains the Meteorological Records for 1908, and a list of additions to the library, 1899-1909.

The **Scarborough Philosophical and Archæological Society** has issued its Annual Report for 1908, and it includes the report of the **Scarborough Field Naturalists' Society**. A report of a useful paper on 'Pre-historic Man in the Scarborough District,' by Mr. Rowntree, is included, and amongst the additions to the Museum we notice a timepiece mounted in carved jet, which has apparently been purchased for £5 5s. od. The Society has a balance in hand of £245. We are glad to see that Mr. M. C. Peck is now the President. The Recorders of the Naturalists' Society print useful accounts of their work during the year. Would not the list of local non-marine molluscs have been better printed locally, instead of being sent elsewhere, where 'it is hoped they will be able to publish it during the coming year?' We are glad to notice that a careful eye is kept upon the local rare plants. A Power Cod,  $7\frac{1}{2}$  inches in length (rather longer than the average), was caught from the East Pier, and is believed to be the first record for the county.

## RECENTLY DISCOVERED FUNGI IN YORKSHIRE.

C. CROSSLAND, F.L.S.

THE following is the third supplementary list of Fungi discovered in Yorkshire since the issue of the 'Yorkshire Fungus Flora.' It comprises one species new to science, six new to Britain, and nearly fifty species and two var. new to Yorkshire. These bring the total of known Yorkshire Fungi, as we understand them at present, to 2763. There are two confirmations of hitherto solitary records, and several newly-discovered (in Yorkshire) hosts attacked by parasitic fungi. Short descriptions of each of the six new British species are added. The numbers given under each, to follow or precede, are those of the species, as arranged in the 'Yorkshire Fungus Flora.' The reference (\* 'Nat.' . . . )=The species was seen at a Yorkshire Naturalists' Union Excursion, and the record published in the 'Naturalist' on the date given. 'F.F., '08=Mulgrave Fungus Foray.

### NEW SPECIES.

COPRINUS CORDISPORUS Gibbs.

For original description and remarks, see 'Nat.', Mar. '08, p. 100.

S.W.—Sheffield, 1904; Farnley Tyas F.F., 1906.

Mid. W.—Buckden F.F., 1907. N.E. Mulgrave Woods. (F.F. '08, 'Nat.', Jan. '09, p. 25).

Also Wirksworth, Derbyshire. On dung of horse, sheep, and rabbit. [To precede No. 742\*].

### NEW TO BRITAIN.

BOVISTELLA PALUDOSA Lév.

N.E.—Among Sphagnum on the moors near Osmotherley. Y.N.U. Exc., August 1st-3rd, '08.

'Only one previous gathering of this species is known: that made by Leveille at Malesherbes, France, 1845; of this gathering, two specimens are in the Museum at Paris, and one at Kew.' (\* 'Nat.', Dec. '08, p. 457).

'*Peridium* reddish brown, subglobose, contracted to a short stem-like base, thin, becoming smooth when old. *Cortex* minute,

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\* The number to follow or precede refers to the species in the 'Yorks. Fungus Flora.'

*sub-furfuraceous*. Sterile base scanty. Gleba dark olive. *Capillitium* of separate branched threads, with the main stock thick, 8-10  $\mu$ ., and deeply coloured. Spores globose, smooth, 4-5  $\mu$ ., with slender pedicels, 10-12  $\mu$ . long.' (C. G. Lloyd, 'Mycological Notes,' Cincinnati, Aug. 1906, p. 280. Pl. 87, fig. 8).

[To follow No. 29].

TRICHOLOMA CARNEOLUM Fr.

N.E.—Mulgrave Woods. Among short grass. (F.F., '08, 'Nat.', Jan. '09, p. 24).

'Small; pileus plano-depressed, obtuse, even, flesh-red, then pale; gills closely crowded, very broad behind, shining white,' ('Mass. Eur. Agaricaceæ,' p. 24). [To follow No. 118].

NOLANEA MINUTA Karst.

N.E.—Arncliffe, near Osmotherley. On bank of peaty ditch. (\*'Nat.', Nov. '08, p. 410).

'Pileus convex, sometimes umbilicate, striate up to the umbilicus, glabrous, pallid fuscous, paler when dry, and shining; gills adnate, pallid; stem pallid fuscous, glabrous; spores rough, 7-9  $\mu$ .' ('Mass. Eur. Agar.', p. 131).

[To come last in the genus in 'Y.F.Flo.' p. 69].

PHOLIOTA SORORIA Karst.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 25).

'Pileus convex, expanded, slightly striate, squamulose, tawny-cinnamon; gills sinuato-adnate, crowded; stem equal, wavy, colour of pileus then paler, variegated with white squamules, apex scurfy; spores 6-7  $\times$  3-4  $\mu$ .' ('Mass. Eur. Agar.', p. 146). [To follow No. 412].

INOCYBE COMMIXTA Bres.

N.E.—Mulgrave Woods (F.F., '08, 'Nat.', Jan. '09, p. 25).

'Pileus conico-campanulate, expanded, umbilicate, shining white or tinged grey, fibrillosely silky, edge often split, dry; gills closely crowded, free, white then greyish cinnamon; stem solid, white, equal, apex scurfy, base minutely turbinate bulbous; spores angular, 10  $\times$  7  $\mu$ . Closely resembling *I. geophylla*, differing in base of stem and angular spores.' ('Mass. Eur. Agar.', p. 155). [To follow No. 447].

TAPESIA RETINCOLA (Rabh.) Karst. [*Trichobelonium retincolum* (Rabh. 'Krypt Flo.', Disc., p. 592); *Peziza retincola* (Rabh., 'Fungi Eur.', 225); *Belonium retincolum* ('Sacc. Syl. Disc.', p. 495); *Helotium retincolum* ('Rabh., Kalchbr. Szep.',

p. 238, p. 2, f. 1); *Mollisia retincola* ('Karst Myc. Fenn. I.', p. 209).

S.E.—Mere side, Hornsea. On dead stems of *Phragmites communis* (\*'Nat.', Aug. '08, pp. 309-10).

Description taken from the Hornsea specimens:—

*Ascophores* gregarious or scattered, seated on a dark brown subiculum, attached to the matrix by a central point, closed and subglobose at first, then expanded till plane or only slightly convex, with raised margin, disc pale yellow or whitish, 1.5—3 mm. across, margin lobed in well-grown specimens, exterior dark grey-brown, margin pale; excipulum of radially densely intermingled, hyaline, hyphæ 2—2.5  $\mu$  thick, cortical cells brown, globose, 11-14  $\mu$  diam, running out to elongated, hyaline, parallel cells at the margin; Asci narrowly clavate, apex narrowed to an obtuse point, 100-120  $\times$  7  $\mu$  (broadest part); Spores 8, hyaline, sub-biseriate, straight or curved (mostly curved), linear fusiform, ends rounded, 20-23  $\times$  3  $\mu$ , irregularly guttulate, oftenest with 3-4 globules at each end, centre indistinctly minutely granular, no trace of septa; paraphyses sublinear, slightly widening upwards, 3-4  $\mu$ , thick, contents granular in some, homogeneous and glistening in others, difficult to separate from the asci.

Hyphæ of subiculum dark brown, flexuous, 4.5-5  $\mu$  thick.

## NEW TO YORKSHIRE.

GEASTER MAMMOSUS Chev.

N.W.—A fine collection of this 'earth star' was found under a hedge, pasture side, near the village of Witton, Wensleydale, March 1908, by W. A. Thwaites, Masham. [To follow No. 12].

LEPIOTA GLIODERMA Gill.

N.E.—Mulgrave Woods. On the ground among grass. (F.F., '08, 'Nat.', Jan. '09, p. 24). [To precede No. 80].

TRICHOLOMA SQUARRULOSUM Bres.

N.E.—Mulgrave Woods. On the ground. (F.F., '08, 'Nat.', Jan. '09, p. 24). [To follow No. 107].

T. CERINUM Quel.

N.E.—Mulgrave Woods, (F.F., '08, 'Nat.', Jan. '09, p. 24). [To follow No. 115].

CLITOCYBE COMITALIS Gill.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 24). [To follow No. 139].

*C. AMPLA* (Pers.).

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 25)  
[To follow No. 149].

*C. EXPALLENS* (Pers.) Quel.

S.W.—Battysford, near Mirfield, on the ground in a pasture,  
Oct. '08. F. Buckley. Com. A. Clarke.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 25).  
[To follow No. 164].

*C. STEVENSONI* Sacc.

S.W.—Firthhouse, Stainland, nr. Halifax. Among grass on  
embankment, Nov. 1908. A. Clarke. [To follow No. 189].

*C. EXSCULPTA* Fr.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 25).  
[To come between Nos. 199-200].

*VOLVARIA MEDIA* Gill.

N.E.—Mount Grace Priory, on gravelly path, Aug. '08.  
(\*'Nat.', Nov. '08, p. 410). [To precede No. 320].

*PHOLIOTA TERRIGENA* Fr. (*Includ. P. Cookei* Fr.).

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 25).  
[To precede No. 396].

*INOCYBE HIRSUTA* Lasch.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan., '09, p. 25).  
[To follow No. 419].

*I. HÆMACTA* Berk & Cke.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 25),  
[To follow No. 423].

*CORT* (Phleg.) *VARIICOLOR* Fr.

N.E.—Mulgrave Woods (F.F., '08, 'Nat.', Jan. '09, p. 25).  
[To follow No. 540].

*CORT* (Tela.) *MACROPUS* Fr.

N.E.—Mulgrave Woods, (F.F., '08, 'Nat.', Jan. '09, p. 25).  
[To precede 587].

*CORT* (Tela.) *BOVINUS* Fr.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 25).  
[To precede No. 598].

*PSILOCYBE AGRARIA* Karst.

S.E.—Firby Wood, Kirkham Abbey, on the ground near

rotting stump. York and District F.N.C. ('Nat.', Oct. '08, p. 386. [To follow No. 687].

PAXILLUS EXTENUATUS Fr.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 25).  
[To follow No. 757].

HYGROPHORUS MUCRONELLUS Fr.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 26).  
[To follow No. 792].

RUSSULA ATROPURPUREA Kromb.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 26).  
[To follow No. 871].

R. SEROTINA Quel.

S.E.—Firby Wood, Kirkham Abbey. York and District F.N.S. ('Nat.', Oct. '08, p. 386). [To follow No. 875].

R. CONSOBRINA var. *intermedia* Cke.

Mid. W.—Clapham. (Exc., Sept. 5-7, '08).

CANTHARELLUS GLAUCUS Fr.

S.W.—Slaithwaite, Among short grass on bowling green, Sep. 1908. D. Haigh and E. J. Walker. Com. A. Clark. [To follow No. 911].

MARASMIUS WYNNEI B. and Br.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 26).  
[To follow No. 922].

BOLETUS CHRYSENTERON var. *versicolor* Rost.

Mid. W.—Stainer Wood, near Selby, Aug. '08, W. N. Cheesman. Some authorities consider this to be a distinct species.

POLYPORUS LACTEUS Fr.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 26).  
[To follow No. 1036].

HYDNUM SORDIDUM Weinm.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 26).  
[To precede No. 1117].

H. STIPATUM Fr.

Mid. W.—Near Selby, on rotting wood, Jan. 27th, '08. W. N. C. [To follow No. 1122].

HYMENOCHÆTE FULIGINOSA Lév.

Mid. W.—Stainer Wood, near Selby, on birch bark, Oct. 1908. W. N. Cheesman. [To follow No. 1173].

(To be continued).



## NEW BOTANICAL BOOKS.

**Stocks**, by **R. P. Brotherston**, and **Lawns**, by **W. J. Stevens**, are two further well-illustrated penny pamphlets issued by the London Agricultural and Horticultural Association.

**Asters**, by **Walter Wright, F.R.H.S.** London: Agricultural and Horticultural Association. Price One Penny.

This is the eighteenth 'One and All' garden book, and ought to be as popular as any of its predecessors. The writer is well known and is esteemed not only for his practical knowledge, but for a fine literary style. The book is fully illustrated. A similarly illustrated pamphlet, dealing with **Tomatoes**, by **W. Iggulden**, has also recently been issued from the same house.

**Synopsis of the British Basidiomycetes.** A descriptive Catalogue of the Drawings and Specimens in the Department of Botany, British Museum, by **Worthington George Smith**: British Museum, London. 531 pp., 10/-.

A few years ago the British Museum acquired the MS. descriptions drawn up by Mr. Worthington G. Smith, when preparing the fine series of coloured drawings of British Fungi, exhibited in the Department of Botany. These descriptions were accompanied by line drawings, illustrating the characters of each genus. It was rightly considered by the Trustees that these descriptions and drawings, if put in convenient form, would prove a useful introduction to the study in the field of the larger fungi. This volume is the result; and from the care with which it has been prepared, its arrangement, the wealth of clear sketches, as well as its cheapness, there can be no doubt that it will at once take its place as a constant guide and companion to every mycologist. There is a useful glossary, and an exceptionally carefully compiled and complete Index. Amongst the 'recent additions' we notice the following Yorkshire records: *Tricholoma carneolum*, *Pholiota sororia* and *Inocybe commixta*.

**Life Histories of Common Plants**, by **F. Cavers, D.Sc., etc.** pp. XVI. and 363, with 123 figures. W. B. Clive. 1908, price 3/-.

In this book, Professor Cavers has brought together a large number of interesting and reliable lessons on our common flowering plants. The first chapter deals with the Bean plant in much detail. Chapters 2 to 6 are concerned with seeds and seedlings, nutrition, growth of shoot and root, buds, flowers, fruits and seeds. Then follow ten chapters dealing with the life histories of some three dozen common flowering plants. In four chapters are described the more familiar trees, the concluding chapter treats briefly on the ecology of plants. The book is intended primarily for young teachers studying botany for the certificate examination, and we know of no better book for this purpose. All the important facts are clearly brought out, and no opportunity is lost of encouraging students to make observations at first hand. The chapters on trees are more complete than in any similar book we have seen, and it does not err like some recent books in leaving so large a share of the facts to be discovered by the student, as to become discouraging. The index is much better than some in this series, and errors are few. On page 335, art. 194 should be 190, and coltsfoot rhizomes (p. 273) are misnamed 'runners.' In the chapter dealing with ecology, a paragraph might usefully have been added on the place of trees in vegetation. As it is, students will find here an excellent guide and introduction to their botanical studies.

**Life Histories of Familiar Plants**, by **John J. Ward.** Cassell & Co. pp. XX. and 204, with 86 plates; Price 6/-.

A mere glance at this book shows that the author has used his camera to good purpose, and furnished a series of very interesting and for the most part, useful photographs in illustration of his text. In all there are 121 figures, some from photo-micrographs. The book is intended for 'non-professional' nature investigators who seek the why and wherefore of details

of plant structure.' The intention is excellent, but the performance very disappointing. One looks for life histories, and finds, for the most part, scraps of information interwoven with very crude ideas on evolution. Frequent errors occur in elementary details, and little care is exercised as to choice of terms. He speaks of the sycamore fruit constantly as the 'seed,' and explains how the 'seeds' should have developed wings. etc. Of the root-cap he says, 'within this is the true growing tip of the root, but it is the sensitive root-cap which guides the root tip to suitable quarters.' According to the author, the thorns of the Gorse arise thus: 'higher up the stem the leaflets get thinner and sharper, gradually changing into thorns.' Plate XLVII. contains excellent figures of Cacti, but, instead of pointing out the importance of the radiating spines in functioning as a light screen, he says 'they obviously run no risk of getting their leaves scorched by the hot rays of the sun,' overlooking the advantage of protecting the green tissue of the stem. These are only a few of many similar statements the book contains, and we agree with the author when he says, on p. 95, 'It is true that the science of Botany may be pursued by different methods from those I have adopted in this chapter,' and we can only hope it will be.

**The Heridity of Acquired Characters in Plants**, by the **Rev. Prof. G. Henslow, M.A., F.L.S.** John Murray. pp. XII. and 107, with 24 illustrations. 1908, price 6/- net.

The author declares that the object of this book 'is to prove that Evolution—so far as plants are concerned—depends upon the inheritance of acquired characters,' in opposition to Wiesmann's view that such characters are not transmitted unless the influence of the environment reaches the reproductive cells. In this matter Prof. Henslow has set himself a very difficult task, and in reading carefully over his pages, we are by no means certain that his attempt has been successful. He declares with great emphasis that present-day ecologists are all at one in accepting the view he advocates, but he adduces very little evidence of this, and we look in vain for definite experimental proofs brought forward by the ecologists he claims as supporters. He says, 'Germany, France, Denmark, the United States, South Africa abound with ecologists . . . but, as Darwin himself was the first to profound [sic] this view, I called it "The True Darwinism."' Many general observations have been made, and a certain amount of detailed work has been done on the effect of environment on plant form and structure, but examples are exceedingly rare where such modifications are shewn to give rise to new species. Such acquired variations usually persist only so long as the conditions of the environment which called them into being, persist; that is, they are continuous variations but that continuous variations are inherited has not been by any means generally proved, nor is it an easy task.

Another difficulty in dealing with continuous variations is to distinguish those which are genetic from those which are acquired, and in many of the illustrations given in this work, no attempt is made to deal with these distinctions. Cases like the water-butтерcup furnish pretty good examples of the inheritance of acquired characters, but they are so rare that, in spite of the author's many assertions, we still await more such proofs before we can declare with confidence either that 'all structures arise by direct adaptation by response,' or that such acquired characters play an important part in the evolution of species. However, Prof. Henslow brings forward many facts which of themselves, are valuable and interesting and if the book induces workers, even ecologists, to pay attention to the matter and furnish a quality of evidence at all comparable to that of the Mendelians, it will have served a very useful purpose.

¶ Messrs. Cassell & Co. are unquestionably doing excellent service by placing before the public popular botanical works at so very low a price. They are just issuing three excellent publications, all of which will doubtless find a ready sale amongst the increasing number of nature students.

Having regard to the excellence of the illustrations, and the nature of the letterpress, we can safely recommend them to our readers. The late **F. E. Hulme's** well-known **Familiar Wild Flowers** is being published in forty-five fortnightly parts, at 6d. each, and several coloured plates accompany each. By the same author, the firm have issued **Familiar Swiss Flowers**, first series, with twenty-four coloured plates, at 1/- net. It is uniform in size with Mr. Hulme's other work, and the illustrations are even better. On plate XVII. the Dark-winged Orchis is labelled 'Dusky Columbine,' and *vice versa*, but this will doubtless be corrected in a future edition. **Trees and their Life Histories**, by **Dr. P. Groom**, is also being issued in fortnightly parts, at 1/- each, and will be completed with No. 13. Dr. Groom's excellent and trustworthy text is illustrated by photographs by Henry Irving.

## GEOLOGICAL PAPERS.

We have recently received a number of valuable geological pamphlets, which we have pleasure in bringing before the notice of our readers. **The Fluorspar Deposits of Derbyshire**, by Messrs. C. B. Wedd and G. C. Drabble ('Trans. Inst. Min. Engineers,' Vol. XXV.) deals exhaustively with the occurrence, composition, and commercial value of 'Blue John,' etc. It is accompanied by a sketch-map of the Carboniferous Limestone of Derbyshire, shewing Fluor-bearing Veins and Pipes. Mr. R. Bullen Newton sends two pamphlets. The first, **Fossil Pearl Growths** ('Proc. Malacological Soc.', Vol. VIII.) describes many occurrences of pearls in fossil shells from various strata, chiefly of Mesozoic age. They are recorded in *Volcella*, *Inoceramus*, *Perna*; and *Gryphæa*. Several excellent illustrations accompany the paper. The second paper, **Relics of Colouration in Fossil Shells** (loc. cit., Vol. VII.), deals with the traces of the original colouring to be found in fossil mollusca. The list given is a very extensive one, and includes examples from Cainozoic, Mesozoic and even Palæozoic strata. The plate accompanying this paper might almost be an illustration of recent species, so clearly are the markings shewn. From the same journal, Mr. A. J. Jukes-Browne reprints a useful paper on the **Genera of Veneridæ in Cretaceous and Older Tertiary Deposits**. The author points out that the family doubtless originated during Jurassic times, and he makes the interesting suggestion that the *Veneridæ* possibly developed along two different lines of descent; the possibility of the latter mode of origin being suggested by the great difference which is observable among the Cretaceous representatives. Mr. Jukes-Browne holds that the characters of the hinge in these shells afford the best and most convenient means of distinguishing the generic groups from one another. The paper is illustrated by a plate shewing excellent drawings of the hinges of twelve Cretaceous and Eocene Venerids. Dr. F. A. Bather kindly sends three useful papers. The first entitled '**Visit to the Palæontological Exhibit in the Science Hall, Franco-British Exhibition**' ('Proc. Geol. Assn.', Vol. XX., part 7), is a description of the various methods employed in the study of fossils; and deals with the subject under the heads of collecting, preparation and preservation, study, and presentation of results. Those who are under the impression that a palæontologist's outfit consists of a hammer, chisel and hatpin, will be severely 'disillusionised' on reading this paper. His second paper **The Preparation and Preservation of Fossils** ('Museums Journal'), deals more particularly with the question of freeing specimens from the matrix; whilst the third is on similar lines, and refers to **Nathorst's Methods of Studying Cutinised Portions of Fossil Plants** ('Geol. Mag.', Decade V., Vol. V.). The method of freeing fern spores from an apparently homogeneous mass of palæozoic rock, reads almost like a fairy-tale, and demonstrates that there are many more ways of unravelling the secrets locked up in the rocks than are dreamt of in most men's philosophy. From Mr. W. J. Lewis Abbot, F.G.S., we have received a reprint of his exceptionally complete and carefully considered account of '**The Pleistocene Vertebrates of South-east England**.' This contains particulars of no fewer than 127 species.

# THE PHYTOPLANKTON OF THE ENGLISH LAKE DISTRICT.

WM. WEST, F.L.S.,  
AND  
G. S. WEST, M.A., D.Sc., F.L.S.

(Continued from page 141).

SPECIES.	Cumberland.							Westmorland.									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>Coocconeia cymbiforme</i> var. <i>parvum</i> (W. Sm.) Van Heurck.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>gracile</i> (Rabenh.) G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>lanceolatum</i> Ehrenb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>ventricosum</i> (Kütz.) G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Amphora ovalis</i> Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Epithemia turgida</i> (Ehrenb.) Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Nitzschia palea</i> (Kütz.) W. Sm.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>Sigma</i> (Kütz.) W. Sm.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Surirella robusta</i> Ehrenb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" var. <i>splendida</i> (Ehrenb.) Van Heurck.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>biseriata</i> Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>linearis</i> W. Sm.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
MYXOPHYCEÆ.																	
<i>Anabaena flos-aquæ</i> (Lyngb.) Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>Lemmertmannii</i> Richter	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Lyngbya bipunctata</i> Lemm.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Oscillatoria Agardhii</i> Gomont	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>irrigua</i> Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>rubescens</i> D.C.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Oscillatoria tenuis</i> Ag.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Merismopedia æruginæa</i> Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>glauca</i> (Ehrenb.) Näg.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Gomphospharia lacustris</i> Chodat	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Calosphaerium Kützingerianum</i> Näg.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Microcystis æruginosa</i> Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>incerta</i> Lemm.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>putherea</i> (Wood) Migula	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>stagnalis</i> Lemm.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Chroococcus minimus</i> (Keissler) Lemm.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>turgidus</i> (Kütz.) Näg.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Naturalist.

SPECIES.	Cumberland.										Westmorland.									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17			
<b>FLAGELLATA.</b>																				
<i>Synura wella</i> Ehrenb. . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Mallomonas longiseta</i> Lemm. . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Dinobryon cylindricum</i> Imhof. . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>divergens</i> (Imhof.) Lemm. . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>elongatum</i> Imhof. . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
"    " <i>undulatum</i> Lemm. . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>PERIDINIEÆ.</b>																				
<i>Gymnodinium paradoxum</i> Schilling . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Peridinium inconspicuum</i> Lemm. . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>tabulatum</i> (Ehrenb.) Clap. & Lachm. . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>Walleri</i> Huitfeldt-Kaas . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Ceratium hirundinella</i> O. F. Müller . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>cornutum</i> (Ehrenb.) Clap. & Lachm. . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

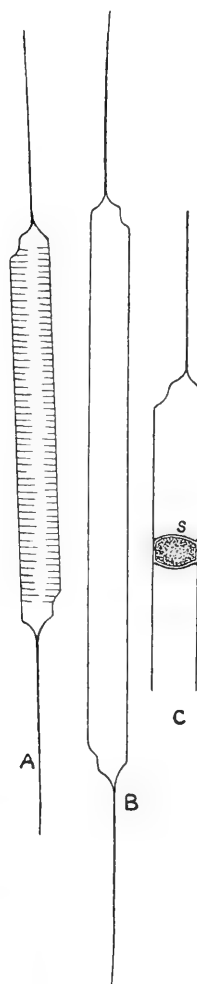


Fig. 2. AC.—*Rhizosol enigmorsa* W. & G. S. West, from the plankton of Thirlmere.  $\times 430$ . C is a portion of a cell containing a resting spore (s).

### III.—THE PERIODICITY OF THE PLANKTON OF WINDERMERE.

Of the periodical collections of plankton we have been receiving from three lakes of the English Lake District, only those from Windermere have hitherto extended over a sufficient length of time to enable us to draw up a report on the periodicity of the plankton-constituents. These collections commenced in September 1907, and were made at fairly regular monthly intervals until August 1908. We are indebted to Mr. Frank Holmes, of Bowness, for continuing to make the collections according to instructions, and also for recording the water-temperatures at the time of collection.

#### MONTHLY STATEMENT OF PLANKTON FROM SEPT. 1907 TO AUG. 1908.

*September 1907.*—Water-temperature 14.4°C. (=58°F.). Mixed Crustacea and Desmid plankton. The Crustacea consisted of *Bosmina longirostris*, *Daphnia longispina*, and others. The Desmids were very conspicuous, more particularly the following six species—*Cosmarium subtumidum* var. *Klebsii*, *Xanthidium subhastiferum* var. *Murrayi*, *Staurastrum curvatum*, *St. jaculiferum*, and *St. paradoxum*. The Diatoms were mostly *Tabellaria fenestrata* var. *asterionelloides*, which was present in quantity, and *Asterionella gracillima*. *Dinobryon cylindricum* var. *divergens* was in moderate quantity, and certainly more abundant than in any other month of the twelve during which collections were made. *Ceratium hirundinella* and *Peridinium Willei* are both general. Rotifers numerous. *Cælosphærium Kützingianum* rather common.

*October 1907.*—Water-temperature 9°C. (=48°F.). Largely a Desmid plankton, the four most conspicuous species being *Xanthidium subhastiferum* var. *Murrayi*, *Staurastrum curvatum*, *St. cuspidatum* var. *maximum*, and *St. paradoxum*. *Cosmarium subtumidum* var. *Klebsii* has practically disappeared. Small colonies of *Sphærocystis Schroeteri* are frequent. *Ceratium hirundinella* is fairly general, but there is less *Cælosphærium Kützingianum*. Rotifers numerous. Increase in quantity of *Asterionella gracillima*.

*November 1907.*—Water-temperature 7.2°C. (=45°F.). Gradually becoming a Diatom plankton. Great increase in the quantity of *Asterionella gracillima*. A number of littoral Diatoms washed into the plankton, mostly belonging to the *Naviculaceæ*. The three following Desmids were still con-

spicuously abundant:—*Xanthidium subhastiferum* var. *Murrayi*, *Staurastrum curvatum*, and *St. paradoxum*. The amount of *Cælosphærium Kützingianum* has greatly diminished. Fewer specimens of *Ceratium hirundinella*, but an increasing amount of *Mallomonas longiseta*. Rotifers numerous.

December 1907.—Water-temperature 3.2°C. (=38°F.). A mixed plankton much less in general bulk than in the preceding months. *Asterionella gracillima* in great abundance, but *Tabellaria fenestrata* var. *asterionelloides* has almost disappeared. *Mallomonas longiseta* reaches its maximum abundance. The rest of the phytoplankton has much diminished, although several Desmids are present in small quantity. *Peridinium Willei* is exceedingly rare, and *Ceratium hirundinella* has completely vanished. Crustacea present in considerable numbers, but Rotifers are few.

January 1908.—Water temperature 1.1°C. (=34°F.). *Asterionella gracillima* still very abundant. Few specimens of *Mallomonas longiseta*. Several species of Desmids (of which *Staurastrum jactuiferum* is most noticeable), not uncommon. One specimen of *Pediastrum glanduliferum* was observed, doubtless washed into the plankton from the shores. Crustacea fairly common, but Rotifers scarce.

February 1908.—Water-temperature 0.2°C. (=32.5°F.). Very little phytoplankton, but a fair number of Crustacea. *Asterionella gracillima* somewhat less abundant, but still numerous. *Melosira granulata* beginning to get conspicuous.

March 1908.—Water temperature 0.4°C. (=33°F.). Crustacea dominant, but the whole plankton of little bulk. *Melosira granulata* is more abundant, but the numbers of *Asterionella gracillima* have very greatly diminished. A few specimens of *Tabellaria fenestrata* var. *asterionelloides*, and also of *Mallomonas longiseta*, were observed.

April 1908.—Water-temperature 1.7°C. (=35°F.). *Melosira granulata* abundant and *Asterionella gracillima* fairly common. A number of littoral species of Diatoms washed into the plankton. Several species of *Staurastrum* represented by few specimens. Two spring forms—*Ulothrix zonata* and *Synura uvella*—were not uncommon.

May 1908.—Water-temperature 4.4°C. (=40°F.). An *Asterionella*-plankton with a fair quantity of *Melosira granulata*. *Rhizosolenia morsa* not uncommon, and a little *Tabellaria fenestrata* both in the typical chain disposition and in the star-

disposition (var. *asterionelloides*). A few specimens of *Ceratium hirundinella* make their appearance.

*June 1908.*—Water-temperature 8.3°C. (=47°F.). A marked *Asterionella*-plankton, *A. gracillima* reaching a maximum greater than the Nov.-Jan. maximum. *Tabellaria fenestrata* var. *asterionelloides* fairly numerous, but *Melosira granulata* quite disappeared. A few Desmids have appeared, and also the first bits of *Anabæna Lemmermannii*. Plenty of Crustacea, but all of one species—*Bosmina longirostris*. Rotifers becoming evident.

*July 1908.*—Water-temperature 11.6°C (=53°F.). A Crustacean plankton, with a large amount of *Bosmina longirostris*, *Daphnia longispina*, and Copepods. A few Desmids are fairly evident, and also a thin species of *Spirogyra*. *Ceratium hirundinella* quite common, and a few individuals of *Cælosphaerium*. Masses of floating spores of *Anabæna Lemmermannii*. Rotifers increasing in numbers.

*August 1908.*—Water-temperature 12.7°C. (=55°F.). A Crustacean plankton, with a gradually improving phytoplankton. Desmids becoming numerous and *Ceratium hirundinella* plentiful. *Peridinium Willei* abundant. *Microcystis æruginosa* occurred in the plankton-collections for this month, but only a few specimens were seen.

#### GENERAL REMARKS UPON THE PERIODICITY.

The first publication dealing with the periodicity of British phytoplankton was by Fritsch, who recorded the results of a somewhat incomplete series of collections made in the river Thames.\* The next publication was by Bachmann, who gave an account of periodical collections made by Father Cyrill in Loch Ness from July 1904 to May 1905.†

In Windermere, the dominant constituents of the phytoplankton are Chlorophyceæ and Diatoms, the Myxophyceæ never at any time being conspicuous. In all, 65 species have been observed, of which 30 (or 46.1 per cent.) are Chlorophyceæ, 23 (or 35.4 per cent.) Bacillariæ, 7 (or 10.7 per cent.) Myxophyceæ, 3 (or 4.7 per cent.) Flagellata, and 2 (or 3.1 per cent.) Peridinieæ.

\* F. E. Fritsch, 'Further Obs. on the Phytoplankton of the R. Thames,' Ann. Bot. XVII., Sept. 1903.

† Bachmann, 'Vergleichende Studien über das Phytoplankton von Seen Schottlands und der Schweiz,' Archiv. für Hydrobiol. u. Planktonkunde, III., 1907, pp. 85-88.



The Entomostraca reach a maximum towards the end of August, about the period of highest water-temperature, in consequence of which during this period, the greatest actual bulk of plankton is collected in the nets.

The plankton of Windermere has three fairly distinct phases, which can be stated as follows:—

- I.—*January-April* (cold period). *Melosira granulata* phase. During February and March the phytoplankton is at its minimum.
- II.—*May-July* (vernal rise of temperature). First maximum of *Asterionella gracillima* in May and June. The Crustacea are dominant in July.
- III.—*August-December* (autumnal fall of temperature). The Desmid phase extends from August to November, and is most noticeable in September and October. In November is a second maximum of *Asterionella gracillima*. The Crustacea are dominant in August.

It will be noticed that the great increase of the Entomostraca follows immediately after the enormous maximum of *Asterionella gracillima* in May and June. This affords confirmatory evidence of the conclusion arrived at by Kofoid \* that *Asterionella* is one of the primary sources of food of the Entomostraca *Bosmina*, *Daphnia*, *Cyclops*, and *Diaptomus*.

CHLOROPHYCEÆ. The Green Algae attain their maximum abundance in September and October, *i.e.*, at the end of the summer period and the beginning of the autumnal decline in temperature. This is in close agreement with the greatest abundance (July to the middle of October) of Chlorophyceæ in the Central European lakes, as recorded by Schröder,† Lemmermann,‡ and many others.

In the April plankton numerous filaments of *Ulothrix zonata* occurred, doubtless carried into the lake by floods in the feeding streams and becks.

All the Desmids attained their greatest abundance during the autumnal fall of temperature. The same was also true of

\* C. A. Kofoid, 'The Plankton of the Illinois River—1894-1899,' Bull. Ill. State Lab. of Nat. Hist., May 1908, vol. VIII., art. 1, p.

† B. Schröder, 'Das Pflanzenplankton preussischen Seen' in Seligo's Untersuch. in dem Stuhmer Seen, Danzig, 1900.

‡ Lemmermann in 'Forschungsb. Biol. Stat. Plön,' X., 1903; in 'Zeitschrift für Fischeri,' XI., 1903; etc.

the Protococcoideæ, but no species of this order ever became really common, although *Sphærocystis Schroeteri* was the most frequent. *Botryococcus Braunii* was only observed from August to October, and then in very small quantity.

The maximum abundance of plankton-Desmids occurs in late September, or early October, in almost all the British lakes,\* and it is also the period of abundance of these Conjugates in the littoral region and in the bogs.

**BACILLARIEÆ.** The Diatoms do not attain a universal maximum at one definite period of the year, but the various plankton-species reach their maxima at different periods.

*Melosira granulata* has its maximum in April (temp. 1.7°C.) at the end of the cold period and the beginning of the vernal rise of temperature. This is in general agreement with the

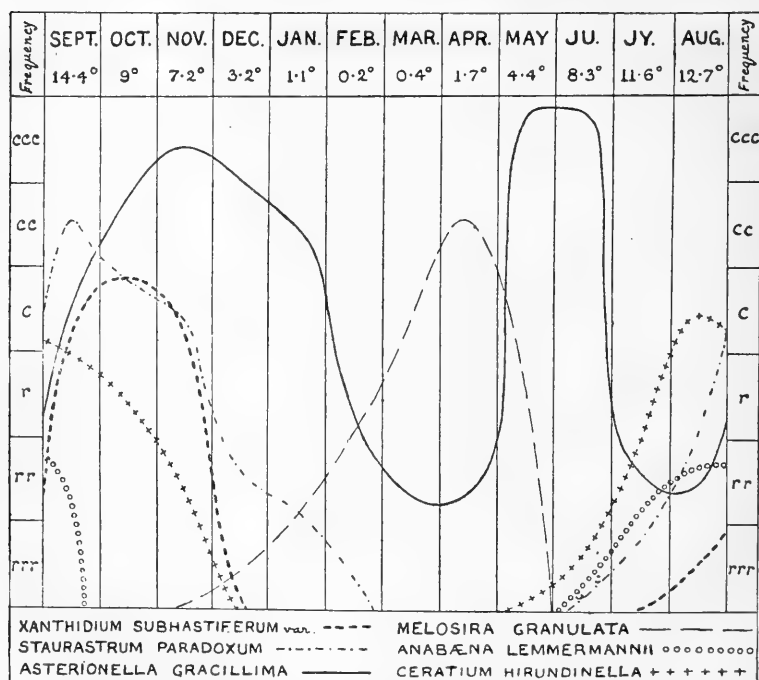


FIG. 3. Chart showing the periodicity of six of the most abundant constituents of the Windermere plankton from September 1907 to August 1908. The temperatures are in degrees Centigrade.

\* In the Schœnenbodensee Tanner-Fullemann (*vide* 'Bull. de l'Herb. Boissier, 'VII., 1907) has recorded certain species of Desmids as occurring in quantity in October.

occurrence of this species in the lakes of western Europe. In the plankton of an Australian lake, on the other hand, *M. granulata* was found to reach its maximum abundance in the middle of the warm period with a water-temperature of 21°C.\* There is no doubt, however, that the *Melosira* phase of the Windermere plankton is from January to April or May (consult text-fig. 3), and this agrees with a similar *Melosira*-plankton described by Lemmermann as occurring in the 'Zwischenabner Meeres' from January to April.† In the Plöner See the same author also‡ records a first Diatom period from January to July, and a second one, consisting principally of *Melosira distans* (a closely related form to *M. granulata*) from December to January.

*Asterionella gracillima* has a great maximum in May and June (temp. 4.4—8.3°C.) at which period it completely dominates the plankton (consult Pl. VII. and text-fig. 3), and a second maximum, more prolonged but not so great, from November to January (temp. 7.2—11.1°C.). This double maximum of *Asterionella*, first in spring and then in autumn, appears to be fairly general in deep lakes, and Wesenberg-Lund§ also remarks upon a similar double maximum of *Fragilaria crotonensis* in the Danish lakes.

In investigating the periodic appearance of *Asterionella* in the reservoirs which supply the city of Boston with water, Whipple|| suggested that the maxima were due to disturbing influences having raised up quantities of individuals from the bottom to the limnetic region (either in the vegetative condition or in the form of spores), where they found suitable conditions for rapid multiplication. He regarded summer and winter as two periods of stagnation, whereas the spring and autumn were largely periods of storm, with the necessary conditions for disturbing the water and setting up convection currents such as would raise this bottom-flora to the surface.

\* G. S. West in 'Journ. Linn. Soc. Bot.', 1909, XXXIX., p. 21. It seems quite likely that under the general name '*Melosira granulata*,' more than one form is included, these forms attaining their maxima under different conditions of temperature.

† Lemmermann in 'Ber. Deutsch. Botan. Ges.', XVIII., 1900, p. 140.

‡ Lemmermann in 'Forschungsab. Biol. Stat. Plön.', X., 1903, p. 126.

§ Wesenberg-Lund, 'Plankton Investigations of the Danish Lakes, Copenhagen,' 1908, p. 50.

|| G. C. Whipple in 'Technol. Quarterly,' VII., 1894; Whipple and Jackson in 'Journ. of New England Waterworks Association,' XIV., 1899.

*To be continued).*

## SOME BRITISH EARTHMITES.

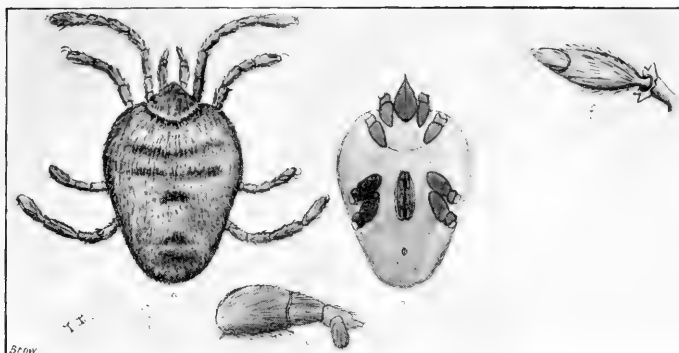
*Trombididæ.*

(PLATE X.)

C. F. GEORGE, M.R.C.S.

*Ottonia conifera*.—This mite is somewhat heart shaped, being much wider in proportion to its length; it is comparatively small, not more than half the size of *bullata*. Mr. Soar's measurement is—length, 1.76 mm. The colour is orange red, and the legs of the usual formation in these mites, the front leg being the longest; the last joint being somewhat clubbed. The palpi have two claws at the end of the fourth joint, and the fifth is bag shaped and rather small (fig. c). The eyes are prominent at the side of the cephalothorax, and have two ocelli each. The most remarkable point is the structure of the hairs, or papillæ of the back. I was fortunate enough to isolate and mount one of these, in good condition, attached to its socket. Mr. Soar has given a good drawing of this, highly magnified (fig. F.). It consists of a cone, apparently hollow, covered with very fine hairs, projecting to a point, and set in an ornamental socket, like a candle in its stick. Of course these papillæ when compressed are liable to open out somewhat, and become more cup-shaped, and the fine terminal hairs break off at the curved line, near the distal end of the papilla (fig. F.). Mr. Soar found the mite in moss at Oban; and Mr. Evans sent me one found by him in a mole's nest early in 1908.

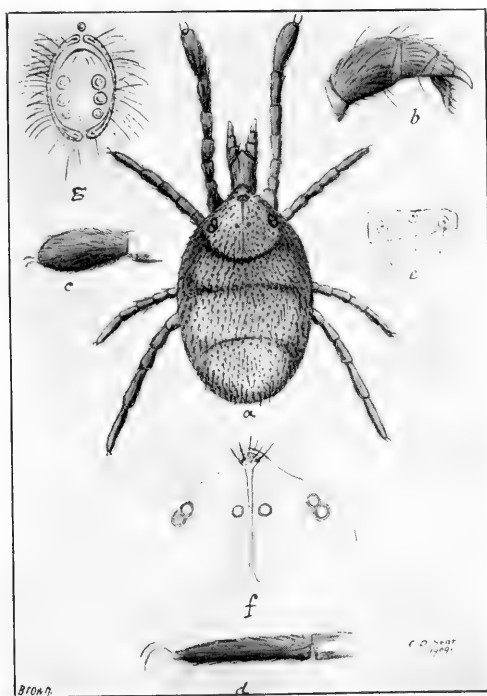
*Ottonia evansii*.—I have named this little creature in honour of the finder, Mr. Wm. Evans, of Edinburgh, to whom I am indebted for this and other specimens of this beautiful and interesting group of mites. In size it is rather small, and in general shape much like other members of this group; the eyes are situated on the shoulders, one on each side, embedded in the skin, each having two ocelli. The fourth joint of the palpus has, besides the terminal claw, a smaller accessory one, not shown in the figure. The fifth joint is small, and differs considerably in shape from the others already figured, seeming to oppose the claw at the end of the fourth joint, and thus make a forceps (see Mr. Soar's figure H.). The legs are covered with very fine hairs; the front ones are the longest, and have the terminal joint thicker and club-shaped (figure c.), the last joint of the fourth pair is rather slender (fig. D.), the hairs are not barbed. The hairs or spines on the body are simple, rather short, and



***Ottonia confiera.***

Oban 20-7-07. Found in Moss by C D Soar.  
Light orange Red.  
Length 1.76 mm. x 31.  
Palpi 0.44 mm. x 100.

- d. Hairs on body.  
e. Eye.  
f. Body hair highly magnified.



- a. ***Ottonia evansii.***  
b. Palpus.  
c. End joint of first leg.

- d. End joint of last leg.  
e. Hairs or spines of back.  
f. Crista.



not very close together. They are bent backwards, and appear to arise from small circular or oval plates of chitin (fig. E.). The Crista (fig. F.), is remarkable, inclosing at its anterior extremity a small capitulum, carrying a few shortish hairs. On each side of the crista, about half way down, is a circular stigma. The Vulva (fig. G.) is also rather remarkable in having the copulatory discs placed low down, and differing a little in size, well shewn in the figure. I consider this mite a very characteristic *Ottonia*, having, however, the spines or papillæ of the back differing completely from any of those previously described.



Dr. W. L. H. Duckworth has recently issued a Descriptive Catalogue of specimens in the Museum of Human Anatomy, Cambridge, part 2 of which deals with '**The Comparative Osteology of Man and the Higher Apes.**' This contains an illustrated description of the contents of six cases, in which are arranged casts and sections of critical bones. Though primarily prepared for the student, this catalogue has much in it of general interest, and is well illustrated.

Two Memorial Volumes have recently been issued. The first is **The Darwin Wallace Celebration** held on Thursday, 1st July, 1908, by the Linnean Society (London. 140 pp., cloth, 5/-). This contains a well-written record of the Celebrations held in London last year, together with illustrations of the Darwin-Wallace Medal, etc. There are also excellent portraits of Darwin, Wallace, Sir J. D. Hooker, Haeckel, Weismann, Strasburger, Francis Galton and Sir E. Ray Lankester. The volume includes reprints of many early notes on the question of Evolution, and is in many ways a useful one to be in the library of any naturalist.

The second volume is a record of the Centenary of the **Geological Society of London**, celebrated September 26th to October 3rd, 1907; and issued in February, 1909. Besides an account of the proceedings on that memorable occasion, it includes copies of the various Addresses presented; the Presidential Address of Sir Archibald Geikie, etc. An admirable portrait of Sir Archibald appropriately forms the frontispiece.

**From an Easy Chair**, by Sir E. Ray Lankester, K.C.B., F.R.S. Constable & Co. 144 pp.

This book contains a number of articles contributed by Sir Ray Lankester to the *Daily Telegraph*. They deal with all manner of subjects, without any regard to method, and may be looked upon as a sort of aristocratic 'Tit-Bits.' Anyway, the articles are certainly reliable, and, of course, well written; in this respect being far more acceptable than the usual drivel which appears in the daily press under the head of 'science' or 'natural history.' Possibly one object of the preparation of these notes was to counteract the flow of blithering nonsense which so often does duty as scientific news in the press, as we know Sir Ray Lankester has frequently protested against it. The book forms a pleasant and profitable comparison for an otherwise idle evening or Sunday afternoon, though we should have preferred seeing anything by this authority in other than paper covers. We should like to state that, having read the book, we have disposed of it in such a way that it will not interfere with its sale. Evidently the publishers feared that the review copy might be placed in some shop, and sold, as the words 'presentation copy' are well stamped in two places, and '1/- nett' is written across the title-page, although 'one shilling net' is printed in bold type (and correctly), on the cover.

## REMAINS OF A CHIMÆROID FISH FROM THE CORAL RAG OF NORTH GRIMSTON.

H. C. DRAKE, F.G.S.

A FEW years ago I spent some time in the Malton district, and amongst other Vertebrate remains from the Corallian rocks I found a piece of bone. I recently sent this, which is embedded in a block of Coral Rag, to Dr. A. Smith Woodward, F.R.S., of the British Museum (Natural History). The specimen was obtained in the large quarry at North Grimston.

Dr. Woodward kindly informed me that it was the right mandibular ramus of *Ischyodus egertoni* Ag., and that it was a new record for the Corallian rocks of England.

The specimen measures 60 mm. from the beak to the hinder margin, and 35 mm. from the symphysial margin to the post-oral margin.

Unfortunately all the teeth are missing, but the rough depressions show where the teeth have been.

Prof. J. Phillips mentions the same species from the Oxford Clay of St. Clements ('Geology of Oxford,' p. 305).

Mr. Buckland in 1835 described the first specimen of *Ischyodus* from the Portland Oolites of Oxfordshire. This measured 7 inches in length, and is the largest specimen of the genus. It was named *I. townsendi*.

Mr. E. T. Newton figures a specimen of mandible of *I. townshendii* from the Portland Oolite of Upway, Dorsetshire, in the 'Proceedings of the Geological Association' July, 1881, p. 117. This agrees very much with my specimen, but it is about twice as large.

Dr. A. Smith Woodward also mentions two species from the great oolite of Northamptonshire in his 'Synopsis of the Fossil Fishes of the English Lower Oolites' ('Proc. Geol. Assoc.,' Vol. II., No. 6).

I have to thank Dr. Woodward for his kindness in determining this and numerous other specimens for me.

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Messrs. Witherby & Co. have launched a new monthly publication—'Travel and Exploration' (1/- net), the first part of which has been sent to us. It contains numerous well-written and well-illustrated articles, dealing with various parts of the world, starting off with 'The Nasamonians—A Call to Exploration,' by Sir Clements R. Markham, K.C.B., F.R.S. The magazine will doubtless be much appreciated by those interested in travel.



## MUSEUM NEWS.

From the **Norwich** Museum we have received its Report for 1908, with list of additions, including many valuable archæological and natural history specimens; and also the First Annual Report of the Norwich Museum Association, founded 1907, under the auspices of the Norwich Castle Museum Committee. This Association, with Mr. F. Leney as Secretary, illustrates in an excellent way the practical use that may be put to a museum and its contents, by popular lectures of interest to agriculturalists, etc.

We have recently received three excellent handbooks from the Bankfield Museum, **Halifax**, written by the Hon. Curator, Mr. H. Ling Roth. The first (No. 5, 45 pp., 1/-) is entitled 'Trading in Early Days,' and is the lecture delivered before the Halifax Scientific Society last September. No. 6 (10 pp., one penny), deals with 'Hand Woolcombing,' and No. 7 (20 pp., 2d.) is an account of 'Mocassins and their Quill Work,' and is reprinted from the Journal of the Royal Anthropological Institute. All are well illustrated by drawings of specimens in the Bankfield Museum. Mr. Roth is to be congratulated upon these valuable publications.

Mr. S. L. Mosley, the Curator of the **Keighley** Museum, periodically publishes pamphlets bearing upon objects in his collection. 'These Notes are printed (1) As labels for the Museum; (2) As Lesson-Notes supplied to all the Borough Schools. Outsiders may have them sent post free by subscribing 5/- a year to the Museum.' No. 4 was issued in January, and deals with 'The Rook.' It is illustrated by coloured plates of the Rook, Cockchafer, Daddy-long-legs, Wireworm, etc. No. 5 deals with the Colts foot, and also includes reviews of recent publications; a note on the late Beaumont Park Museum, the collections from which were offered by Mr. Mosley to the Corporation, but were declined; and some rare local birds. In the last we notice 'Nutcacker—an error. A statement in Nelson's "Birds of Yorkshire" that a bird of this kind was shot in Dungeon Wood, and that I had it in the flesh is a mistake, and was inserted without my knowledge. I never had such a bird, nor had my father.' Better paper should be used for these notes.

From the **Lincoln** Museum we have received six penny publications. Nos. 1 and 2 deal with the Lincolnshire Keuper Escarpment and the Pygmy Flint Age in Lincolnshire respectively, and are reprinted from the Transactions of the Lincolnshire Naturalists' Union. These papers were referred to in these columns when reviewing that publication some time ago, so we will not refer to them more than to say they do not appear to have much, if any, connection with the Lincoln Museum. On the other hand, the two illustrated pamphlets on Roman Antiquities (Nos. 3 and 5) by the Curator, Mr. A. Smith, are just of the type the visitor requires, especially seeing that Lincoln is so comparatively rich in Roman remains. From the illustrations given, we should hardly have expected the use of the word 'graceful' so frequently. No. 4 is the Report and General Guide, which appears with one name on the cover, and two inside. In this there is evidence of the Museum having many friends, and it is pleasing to find that some specimens which had reached Lancashire have been returned. It is a pity the people of Lincoln were not alive as to the importance of these objects earlier; the present collection would then have been much richer. No. 6 deals with 'The Owls and Hawks of Lincolnshire,' by the Rev. F. L. Blathwayt, and makes special reference to the collections in the museum. We learn that Nos. 2 and 3 of these publications are already out of print, which seems a pity.

Whether there is any great monetary profit from the sales of these various museum publications or not, there can be no doubt that they benefit the respective museums, and the increasingly large number of institutions issuing them is a good sign.

## NEWS FROM THE MAGAZINES.

A portrait of Thomas Bewick, in a hat, appears as frontispiece to *British Birds* for April.

'Lincolnshire Gulleries' is the title of a paper by the Rev. F. L. Blathwayt, in the April *Zoologist*.

It is proposed to form a small Limited Liability Company to take over the Proprietorship of *Knowledge*.

The number of species of Woodlice in Ireland is now twenty-three, six species having been added during the year.—*Irish Naturalist*, April.

Prof. F. E. Weiss contributes a valuable paper on 'The Dispersal of the Seeds of the Gorse and the Broom by Ants' to *The New Phytologist* for March.

Mr. A. W. Clayden records footprints in the Lower Sandstones of the Exeter district for the first time in that area (*Quart. Journ. Geol. Soc.* November 1908).

*Yorkshire Notes and Queries* has just completed its fifth volume. The editor appeals for a much larger increase in the number of subscribers, or the magazine must cease to exist.

A charmingly illustrated Report on 'The Eruption of Vesuvius in April 1906,' by Dr. H. J. Johnston-Lavis, has been issued as Vol. IX. (series 2) of the *Scientific Transactions of the Royal Dublin Society*.

Mr. E. W. Morse has secured examples of *Trachyphlæus aristatus* and *T. olivieri*, on the banks of the River Witham, below Boston, Lincs., under cut herbage left in heaps to rot (*Entom. Monthly Mag.*, February, p. 33).

With the January number, the well-known *Nature Notes* changes its title to *The Selborne Magazine*—practically its former name. The reason for the change appears to be that 'Nature Notes' was 'too good,' being imitated in various newspapers, and credit was not given for paragraphs borrowed from its pages.

*Knowledge and Scientific News* for January is a particularly good 'Special Double Number,' and contains two articles of particular interest to our readers, viz., 'The Colour of some Wild Animals' and 'Studies in Marine Life, Hydroid Zoophytes' [sic], the latter being particularly well illustrated. This magazine is to be one shilling each month in future.

'Experiences with Eagles and Vultures in the Carpathians' is the title of a paper by Mr. R. B. Lodge, in Vol. XV. of *Aquila*. It is illustrated by a number of photographs taken by the author whilst hidden in a rocky shelter, outside which he shot a horse as 'bait.' He spent eight days in photographing the birds as they came to feed. The article is accompanied by a photograph of 'the observer, our good English friend.'

The *Lancashire Naturalist* has been revived, and No. 13, Vol. II. (query No. 1, of Vol. II.) for April has reached us. The price is 4d. The editor points out that it rests with Lancashire naturalists to decide as to whether it shall appear regularly or not. We notice, however, that (like another journal we might mention) it is 'for the adjacent districts of Cheshire, Derbyshire, Westmorland, North Wales and the Isle of Man.' Why not have taken in Yorkshire and the Lake District? The first paper, on Sparth fossils, by Mr. W. A. Parker, though an excellent one, has already appeared elsewhere. The new *Lancashire Naturalist* is evidently a much more serious journal than its penny predecessor, and if the editor is able to restrict its contents to original papers bearing upon the county, it will serve a useful purpose; and we shall wish it *bon voyage*. Natural history of the 'Tit-Bits' type is not required in provincial journals. It can be obtained *ad nauseam* in the daily press.





John Faircl.

Wood Garlic in a woodland near Stockport.

Photo by]

# THE BROAD-LEAVED WOOD GARLIC OR RAMSONS.

(*Allium ursinum*).

(PLATE XI.).

JAS. E. McDONALD.  
*Stockport.*

Eat Leekes in Lide [March], and Ramsins in May,  
And all the year after physitians may play.  
—*Old Proverb.*

WHO has not formed some acquaintance with the repelling garlic odour of this native of moist woods, when its bright, lily-of-the-valley-like leaves have been trampled upon in order perhaps to pluck a few of its dainty-looking flowers?

Like the odours given off by some animals when in danger, this pungent garlic smell is protective, and tends to repel enemies who might otherwise browse upon the plant. In spite of this, cattle will eat the leaves, much to the annoyance of the dairyman, as the milk and butter is tainted thereby.

If it were not for the unbearable odour when plucked, the flowers would be in great demand for bouquets; though when undisturbed, there is only a faint odour of garlic.

If the flower stalks be held gently whilst they are being cut, and the cut ends are wrapped with moist paper until they are carried home, there to be placed in water, the unpleasant odour passes away. One writer remarks that 'a flower in the midst of a bunch of forget-me-not, makes one of the sweetest mixtures of the season.'

No doubt both the striking appearance and the odour of the unbruised flowers serve to attract insects to the honey for the purpose of pollination. The insects seen by the writer on the flowers have been chiefly small humble bees and flies. Hive bees are said to have a great objection to the garlic smell, nothing vexing them more than this plant being thrown amongst them\*. Of course, in this case, the odour caused by bruising would be pungent.

The umbels of from 12 to 20 or even 30 moderate sized flowers are raised above the foliage by the three angled peduncle (scape) during May and June. Previous to their opening, they are enclosed by a papery envelope (spathe) composed of two coherent bracts which are split apart as the flowers open.

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\* Buxton's 'Botanical Guide' (1849).

The scabredity of the pedicels may possibly be of some mechanical assistance in the splitting of the spathe. The flowers are built on the same plan as the lilies, each having a perianth of six white petaloid segments, six stamens, and a three-lobed and three-celled ovary. Nectar is secreted between the rounded, bulging lobes of the ovary. Of the stamens, the three inner are somewhat longer than the three outer, and their anthers dehisce a little earlier. When the flower first opens, the style is short, and the stigma immature, but by the time the anthers of the outer and somewhat shorter stamens have dehisced, the style will have grown, and the now matured stigma brought well up to their level.

If no insect be now forthcoming with pollen—as must often be the case during inclement weather—the stigma touches an anther in the same flower, and becomes self pollinated.

Each compartment of the ovary contains two ovules, but only one of them usually ripens into a seed, so that the ripe capsule is usually but three-seeded. When ripe—towards the end of July, a little after the leaves have decayed—the carpels dehisce loculicidally to liberate the seeds. These are curved, albuminous, with a small embryo, and have a dark crustaceous testa.

Observation of the process of germination of these seeds might well serve as an introduction to the study of monocotyledonous seedlings in general, as they are somewhat easier to understand than cereals such as oats, wheat, maize, etc., so often described in text-books. The embryo of wood garlic has only one cotyledon, this being somewhat cylindrical in form. During germination (which usually begins towards the end of October) this lengthens; one end, that concealing the rudimentary plumule and ending with the rudimentary radicle, being pushed out of the seed. Growing downwards, it buries the plumule a little distance below the surface of the soil. At this stage nearer the seed a little slit will be noticed, it is through this slit that the first leaves from the plumule will emerge after growing up the short tube from the base. Even when previously straight, as shewn in fig. 1, the portions of the cotyledon above the slit, with the seed, becomes pushed to one side by the developing scale and foliage leaves, as shewn in figs. 2, 3, and 4. The other end of the cotyledon, the apex, is modified to act as a sucking organ, and remains in the seed, absorbing the albumen, and transferring it to the developing parts of the

seedling. When the albumen has all been absorbed (this taking some time), the whole cotyledon and the seed coat decay. Whilst the first leaf is developing, the radicle elongates, though not to the extent found in dicotyledons, and a little later this is supplemented by several adventitious roots from the base of

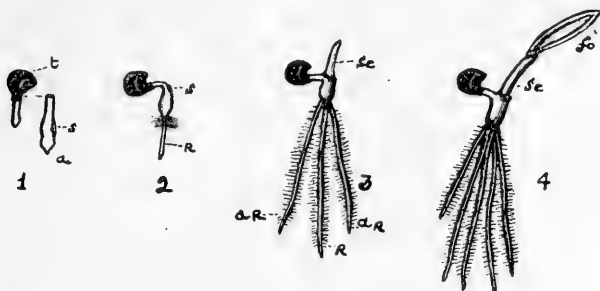


Fig. 1 to 4.—Stages of germination. A, protruded portion of cotyledon of 1 enlarged; s, slit; r, seed coat; R, radicle; AR, adventitious rootlets; Sc, sheathing scale leaf; Fo, first foliage leaf twisting. 1, October; 2, November; 3, January; 4, March

the plumule, each attaining approximately the length of the radicle (see figs. 3 and 4). Only one foliage leaf\* is formed the first season, and it is protected in its passage through the soil by a sheathing scale leaf (Sc, figs. 3 and 4).

A peculiar feature of the foliage leaves is that they are formed in the bud in exactly the reverse manner to those of other plants; that is, the upper surface of the blade is formed like the under surface of other leaves. When the leaf appears above the soil, its petiole twists until the surfaces of the blade are reversed; what was the lower or dorsal surface in the bud is then turned to the light.†

In veneration the edges of the leaves are prettily rolled towards the mid-rib, practically it may be considered revolute,

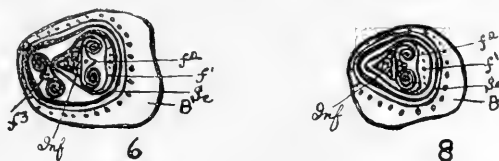


Fig. 6.—Transverse section (diagrammatic) of a mature bulb in January that will multiply, *i.e.* form two by end of season.

Fig. 8.—Transverse section of mature bulb that will only form one new bulb at end of season. Letters as in figs. 7 and 9.

\* Rarely two.

† Sydney H. Vines. 'A Students' Text book of Botany' (1896), p. 164.

but the anomalous structure of the leaf must be remembered (Figs. 6 and 8).

Reverting to the seedling, the sheathing base of the small foliage leaf swells to form the first bulb, and has the plumule safely ensconced within it. Examination will shew that the apices of the bulbs of both seedling and mature plants appear as if they had been cut with some sharp instrument. The explanation is that a transverse layer of corky tissue is formed there before the rest of the leaf has decayed to that point, and its position can be made out by a thin transparent band some time previous to actual decay. This layer of cork, in addition to healing the wound, so to speak, prevents the access of fungi and moisture whilst the bulb is at rest in the damp soil it usually inhabits. Towards the end of May the tiny bulb now formed, comes to rest.

The next growing season (winter months chiefly), in addition to several fine absorptive roots, a thick root is given off from its base, which, when firmly fixed by root hairs near its tip, contracts and pulls the bulb deeper in the soil (fig. 5 CR). Each subsequent year the foliage leaf produced becomes larger until maturity is reached.\* When there are two leaves, the base of the innermost one, which forms the bulb, becomes larger; consequently longer, and stronger, and more numerous contractile roots are required. In adult plants the new bulbs are formed a little higher in the soil than those they replace; so these peculiar roots are necessary to pull them down to the proper level which appears to be about four inches below the surface to tip of bulb.



Fig. 5.—Two year old bulb (B) resuming growth after period of rest CR, contractile root; FR, fine roots; S, scar of last year's leaves; Sc sheathing scale leaf.

NOTE.—First formed bulb at this season differs only in being smaller.

(To be continued).

'Was Darwin Right?' is the title of a discussion being carried on in a contemporary.

'The Claws of Insects' was the subject of the Presidential Address to the Entomological Society. It was delivered by Mr. C. O. Waterhouse on January 20th, 1909, and is printed in the Society's Transactions for the year 1908, part V.

\* Four to five years, perhaps, under favourable conditions.



## FIELD NOTES.

### BIRDS.

**Manx Shearwater near Rotherham.**—Mr. H. Moore kindly sent me a bird for identification, which proved to be a Manx Shearwater. It was picked up alive on August 24th, 1908, at Dalton Brook, on the Doncaster Road, about two miles north-east of Rotherham.—R. FORTUNE.

—: o :—

### BOTANY.

**A Broomrape new to Britain.**—In August 1907 I found a Broomrape growing parasitically upon *Cnicus eriophorus*, within ten miles of Leeds. As it did not agree with the description of any British species, I asked the opinion of Mr. G. Claridge Druce, of Oxford. He, in turn, submitted the specimen to Dr. Beck, who has monographed the genus *Orobanche* and is the recognised European authority. Dr. Beck names it *Orobanche reticulata* Wallroth form *procera* (Koch), and states that the plant is new to Britain. Mr. Druce informs me that the hosts of the foreign plants are species of *Thistle*.—H. E. CRAVEN, Leeds.

—: o :—

### FUNGI.

***Geaster fornicatus* in Yorkshire.**—This comparatively rare fungus was found, April 4th, in a hedge bottom at Masham, by Mr. W. A. Thwaites. This is the first time it has been noticed in V.C. North West. Its only two other Yorkshire records are near Doncaster (Lee's 'Flo.')

; and Castle Howard (Masse's 'Mon. Brit. Gastromycetes,' p. 80). The Masham specimens were of last year's growth, but in splendid condition.—C. CROSSLAND, Halifax, April 6th, 1909.

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### LEPIDOPTERA.

***Ephestia künniella* Zell. at Skelmanthorpe.**—In January 1908 I found a number of larvæ in an oatmeal box belonging to a local grocer. They were in silken cases, about half an inch in length, secured to the sides of the box, and very plentiful. I took a few, and fed them on oatmeal, and during the following summer the moths emerged. Not being able to ascertain the name of the species, I recently sent a few specimens to Mr.

Porritt, and he informs me that the species is one of the Crambites, *Ephestia kühniella*. The species was first taken in our county by the Rev. C. D. Ash, at Skipwith in November 1898, and first recorded as British from Stoney Stratford in Buckinghamshire, in 1887. In all probability it has been introduced here, but there is no doubt about it being plentiful now.—B. MORLEY, February 18th, 1909.

***Sterrha sacraria* at Grange-over-Sands.**—Mr. W. Shackleton of Bradford, recently shewed me a beautiful male specimen of this rare geometrid, which he caught at Grange-over-Sands in early September 1906. According to Mr. South, six or seven specimens were obtained in Lancashire in 1867, and it is interesting to note its occurrence again in that county after the lapse of thirty-nine years. Very few records have been made of this North African species in Britain since 1874.—B. MORLEY, Skelmanthorpe, Huddersfield, March 3rd, 1909.

A small number of specimens have been taken in the extreme Southern Counties during the past few years, several of which are now in my collection.—G. T. P.

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### MOLLUSCA.

***Paludestrina jenkinsi* in Airedale.**—In October last year, Mr. C. T. Cribb, of the Vicarage, Shipley, found, in the river Aire, above Shipton, a number of *Paludestrina jenkinsi* along with other species, on *Elodea canadensis*. The occurrence of this species is worth recording, as it is an inhabitant of the coast, or of the streams that occur near the coast. Yet, by some means or other, it is getting transported to various parts of our inland counties. It was recorded from the river Spen at Cleckheaton, about three years ago, and now from the Aire Valley, so high up as Skipton. It would be interesting to ascertain exactly the cause for this sporadic appearance up and down the country, it having been turned up in several other Midland Counties.—F. BOOTH.

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### GEOLOGY.

**Note on Transported Lias near Filey.**—Those who have followed the elucidation of the Yorkshire coast geology, will remember that certain patches of blue clay which occur in the Boulder-clay at Filey were described by Judd as "Middle

Kimmeridge." This was a pure guess, and (like most guesses), quite wrong. I had noticed years ago that these patches contained Liassic fossils, but as I have always been afraid of being fitted with a certain proverb ( ' Fools step in where angels fear to tread ' ) I held my peace. I was glad, therefore, when Mr. Lamplugh pointed out the true character of these beds. They are simply boulders on a gigantic scale—large masses of transported Lias.

I was at Filey on March 29th, and found the shore and cliffs more swept and scoured than I had ever seen them. The rainfall had been exceptionally heavy, and the sea very rough. Consequently the blue clay beds in the cliff displayed their fossils very conspicuously. *Ostrea cymbium* was specially fine and abundant, and the characteristic *Pholadomya decorata* was strongly in evidence. I concluded that these beds in the cliff belonged to the *jamesoni* zone.

On the shore, towards low water-mark, the removal of the sand had laid bare a considerable surface of black liassic shale. These beds belong to the *communis* zone, for the characteristic ammonite abounded, with numbers of *Leda ovum*. Belemnites were plentiful, but much fractured, having doubtless been injured in transportation.

The scouring of the beach had apparently destroyed the burrows of a delicate little recent shell, *Solen pellucidus*, live examples of which were lying about with *Macra stultorum* and *Syndosmya alba*.—WM. C. HEY.



At a special meeting of the Geological Society of London, a proposal to admit women to candidature for the Fellowship of the Society was rejected by fifty votes to forty.

The 'Greenwell' collection of British Bronze Weapons, which has recently been acquired for the national collection, has been paid for by Mr. J. Pierpont Morgan, and presented to the nation.

'The Geology of the County between Newark and Nottingham' is the title of a Memoir by Messrs. G. W. Lamplugh, W. Gibson, R. L. Sherlock and W. B. Wright, recently issued by H.M. Geological Survey.

Having heard good reports from some of our readers who have stayed at the Hotel at Oswestry, referred to in our advertisement columns, we have every pleasure in drawing attention to the excellence of the Hotel, as well as to the geological and botanical attractions of that district.

At the sale of the first portion of the late T. Maddison's (Durham) collection of Lepidoptera, sold at Steven's Rooms on February 24th last, a single variety of the Common Tiger Moth (*A. Caja*) fetched £13. The specimen was catalogued as bred at Liverpool, in July 1905. Surely a record price for a variety of this or any other moth! Two other varieties of the same moth, in the same sale brought £6 and £5 10s. respectively.

## REVIEWS AND BOOK NOTICES.

**Through Southern Mexico** (being an account of the travels of a Naturalist), by **Hans Gadow, F.R.S., etc.** London: Witherby & Co. 527 pp., 18/- net.

We should like first to congratulate Messrs. Witherby on publishing so sound and substantial a volume as that before us. It is quite refreshing to peruse it, coming, as it does, at a time when so many publishers of natural history volumes seem to think that 'a book's a book, although there's nothing in it.' Dr. Hans Gadow is well known as a careful and accurate observer, and he further has the ability of clearly setting forth his observations in black and white. His visit, therefore, to an inaccessible part of Mexico, where 'you do not need any arms whilst travelling, but when you do, you want them badly,' is bound to be of general interest. Together with his wife, Dr. Gadow has spent a considerable time in the remote parts of Mexico, and observed many interesting facts relating to the geology, botany, zoology, archæology, etc., etc., of that interesting area. Some of the more technical results of his travels have already appeared in the Proceedings of various learned societies, but we think the author was well advised in publishing the narrative of his rambles in the present form. He has been most successful in observing nature in her various phases, and has been able to record many interesting and important new facts. The description he gives are most fascinating, whilst now and then the details of exciting adventures of another kind add an interest to the volume. By the aid of camera and sketch-book, the author has been able to present a very graphic idea of the country he passed through, its natural history and archæological features, and its people. There are over a hundred and sixty illustrations. One drawback (if such it can be called) to the book is that when once it is well started of it must be completed, no matter how busy the reader may be. There is a very good Index, remarkable for the unusual number of X's and Z's used.

In a bulky volume of 544 pages **Mr. F. A. Bellamy** gives '**A Historical Account of the Ashmolean Natural History Society of Oxfordshire, 1880-1905.**'

There is much useful information in the volume, but, on the other hand, there is much that seems trivial; for instance pp. 88-90 are occupied by extracts from the minutes in reference to the days on which the society should meet—each new secretary apparently requiring a change in the dates of the meetings!

**Forest Entomology**, by **A. T. Gillanders, F.E.S.** Edinburgh: W. Blackwood & Sons. 422 pp., 15/- net.

The first impression this book gives is that it is a thoroughly practical and carefully-prepared volume, and that it will at once take its place as the principal treatise on the subjects with which it deals. It is beautifully printed, and illustrated by 351 blocks, many from photographs, and a cursory glance through its pages leaves a very favourable impression. The book is largely based upon observations made in Cheshire and Northumberland, and the author has been assisted by a little army of helpers; while the way in which he has borrowed blocks from other sources puts into the shade the efforts of a certain magazine, which shall be nameless! But when one comes to carefully read the book with only a very fair knowledge of the 'common or garden' (as against 'forest') entomology, its deficiencies become at once apparent, and it reminds one of the gaily dressed duchess-looking damsel on the Manx steamer, who, on being asked if the motion of the boat did not make her ill, replied 'norrit.' The author, the woods manager to His Grace the Duke of Northumberland, is most probably a very capable forester, but his knowledge of entomology is not of the best. However, he admits that 'he has just about the necessary amount of knowledge to make a beginning.' We would therefore recommend him to make a beginning, and then, after devoting some time to the

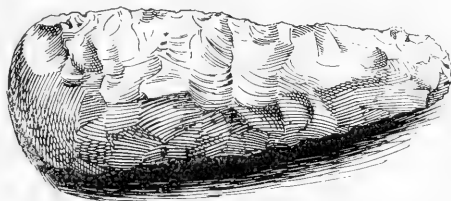
subject, give us a revised issue of 'Forest Entomology.' To enumerate the many errors would not answer any good purpose, but we would suggest to Mr. Gillanders that he hand the book to some qualified entomological friend, for he apparently has several—with the request that he corrects it. Had this been done at an earlier stage, there would probably have been nothing to grumble at. As it is the book might be read with profit by those interested in forestry. The publishers have done their share well.

'One and All Gardening, 1909' (92 Long Acre, W.C., 2d.), contains articles on 'Electricity and Plant Growth,' 'The Magic Circle in Plant Life,' 'In the Track of the Fungus Hunter,' and others likely to interest our readers.

**Hull Museum Publications.** Nos. 53, 54, 56, 57 and 58. Hull: A. Brown & Sons, Ltd. One penny each.

This quintette of pamphlets maintain the high standard of excellence set by their fifty odd predecessors. Their range is a very wide one, a bare enumeration of the subjects dealt with would occupy more space than we can afford; and we can only briefly mention some of the more interesting. No. 53 contains an interesting account of a most valuable addition to the exhibits in the shape of a model of a tunnel shield, scale one inch to a foot, made and presented by a distinguished engineer, a native of Hull, where he received his early training. Apart from the monetary value of the donation, it is said to have cost about £700, its value as an educational exhibit in a city like Hull is inestimable.

Geologists and Palaeontologists will welcome the catalogue of the Lether collection, and the descriptive account of *Eryon ? antiquus* Broderip from the Lias. Antiquaries will revel in the accounts of old agricultural implements, gibbet irons, man-traps, and spring-guns, old engravings,



**Flint Axe-Head from Flamborough.**

maps and deeds, and last, but not least, the pamphlet dealing with forgeries and counterfeit antiquities, in which, as a matter of course, the career of Flint Jack, *facile princeps* of his class is retold. Short notes on various branches of Natural History are also included.

No. 57 is devoted to the Annual Report for 1908, which provides interesting reading. We are pleased to see that the safety of the building in Albion Street has been increased by the removal of the electric light meters from the inside to the outside of the building, and that by a resolution of the Council, the Museums are now open to the public on Sunday afternoons from 2-30 to 5 p.m. We note that this is merely as an experiment for six months, but we should imagine that if the attendances during the first three months of this year are in keeping with those for the last quarter of 1908, as detailed in this report, Sunday opening will have passed the experimental stage, and that the hours will be extended from 2 to 7, or it may be 8 o'clock. The figures given shew an average of 297 visitors per hour at Albion Street, and 34 at Wilberforce House, which seems fairly high, when one considers the limited time within which visits may be made.

The accompanying illustration, from one of the pamphlets, is a reduced drawing of a very fine polished flint axe-head recently obtained at Flamborough.

E. G. B.

## NORTHERN NEWS.

Prof. T. G. Bonney will be president of the British Association meeting at Sheffield next year.

Mr. Joseph Dickenson, F.G.S. has been elected an Honorary Member of the Manchester Geological and Mining Society.

We regret to have to record the death of Dr. J. H. Baily, Isle of Man, a Vice-President of the Lancashire and Cheshire Entomological Society.

We learn from the *Hull Daily Mail* that 'It is a curious truth that a butterfly can be frozen hard, and left so for some hours, yet on being removed to warmth the insect will recover and fly away.'

The plate presented with this number (plate IX.) is an effort on the part of a well-known artist to portray a member of the staff of this journal. It also shews that there are two sides to the question of collecting.

The Sixteenth Report of the Borough of Leicester Museum and Art Gallery has recently been issued, and besides containing particulars of the changes in the institution, includes a list of the additions made from April 1st, 1905 to March 31st, 1908.

Part 6 of Messrs. T. C. and E. C. Jack's 'Wild Beasts of the World' (1/-), contains excellent coloured illustrations of the Glutton, Badger, Skunk, Otter, Coati, and Polar Bear. There are also descriptions of these, and several other interesting mammals.

We are glad to notice that one of the Lancashire Museums has unlimited exhibition space, and is making good use of it. Amongst the recent additions are '40 species British Trees, mounted, illustrating stages of growth.' Wouldn't they have looked better if kept alive, and 'tubbed'?

The Perthshire Society of Natural Science continues to place on record the valuable work of its members. Its recently issued Transactions and Proceedings, published at the Natural History Museum, Perth, is full of useful papers, which are illustrated by a large number of plates from photographs of scenery, rock-sections, stone circles, etc., etc.

We regret to record the death of Professor H. G. Seeley, F.R.S., of King's College, London, whose writings on palæontology and comparative anatomy are well known. Professor Seeley was present at the meetings of Section 'C' at the Dublin meeting of the British Association, though he did not seem to be in his usual health. He was born in 1839.

On April 16th, at the Otley Police Court, a German waiter, employed at the Ben Rhydding Hydro, was—at the instigation of the Y.N.U. Wild Birds Protection Committee—prosecuted for shooting a Tawny Owl in the grounds of the Hydro. A unique defence was set up. Defendant pleaded that in Germany they got 3d. each for shot owls, and he was unaware of the law of this country. He was cautioned and ordered to pay the costs.

A Report of the Corresponding Societies' Committee and of the Conference of Delegates held at the Dublin Meeting of the British Association is issued in advance of the Association's Report. It is sold at the Office of the Association, Burlington House, at one shilling. A valuable feature is the 'Catalogue of the more important papers, especially those referring to Local Scientific Investigations, published by the corresponding Societies during the year ending May 31st, 1908.

We are delighted to find that Prof. P. F. Kendall is the recipient of the Lyell Medal of the Geological Society this year, and that Mr. H. Brantwood Muff, another of our contributors, shares the Lyell Fund with Mr. R. G. Carruthers. Mr. Horace B. Woodward receives the Wollaston Medal, Prof. G. A. J. Cole receives the Murchison Medal; the Murchison Fund going to Mr. J. V. Elsdon. The Bigsby Medal is awarded to Dr. J. S. Flett, and Lady Evans receives the Prestwich Medal.



Collecting: Geology v. Zoology.





# THE NATURALIST.

A MONTHLY ILLUSTRATED JOURNAL OF  
NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY

T. SHEPPARD, F.G.S., F.S.A.Scot.,

THE MUSEUM, HULL;

AND

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TECHNICAL COLLEGE, HUDDERSFIELD.

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF

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RILEY FORTUNE, F.Z.S.

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All communications should be addressed to the Hon. Secretary,  
T. SHEPPARD, F.G.S., The Museums, Hull.

## NOTES AND COMMENTS.

### THE FLAMBOROUGH PEREGRINES.

It is pleasing to note that the Peregrines at Buckton have again successfully reared their young. For some time it has been known that the birds had returned, but it was not until the 'climbing' began that the exact locality of the nest was ascertained. They have bred on the same spot as last year, on the ground climbed by Hodgson, and there are two young birds in full feather. There is no doubt that the interest taken in these birds by the Yorkshire Naturalists' Union is largely responsible for their present safe sojourn on the cliffs.

### SWINGS.

The accompanying photograph, which was exhibited for sale at a photographer's at Bridlington, is interesting as shewing a typical group of 'gallant lads' at Bempton, with their 'climbing' apparatus. It is also of service as it possibly



Photo by]

[Waddington & Gibson.

explains the term 'Hewett's Swing,' which has been heard once or twice recently. From the expressions on the faces there is evidently something unusually serious taking place, and in front of the Lord High Executioner is apparently the culprit, like King Charles at the scaffold, with the rope dangerously near his cervical vertebrae.

### THE GIRLS' REALM EXTENDED.

In the 'Girls' Realm' for March, Magdalen F. P. Tuck, who comes 'of a race whose love for the *feathered* fowls of the

air is inherited from generations back,' writes on 'A Girl Cliff-Climber Down Bempton Cliffs,' the girl referred to being Magdalen F. P. Tuck, and she is actually photographed whilst over the cliff. In one of the photographs, she is represented as looking upwards, with a slack rope in her hand, possibly Hewett's swing! She is evidently an accomplished girl, as early in the article we find she writes 'I lie comfortably on my face,' which is more than many could do. We believe that is the only 'lie' she relates, though one of the photographs was certainly not taken within miles and miles of Bempton. We are also glad to find that the printers of the 'Girls' Realm' have a good stock of capital 'I's.'

#### EGGS AS TOPS.

Another magazine, which, for obvious reasons has recently adopted the title 'Science Gossip' (though why 'Science' it is difficult to say!) also has an article on 'The Birds on Bempton Cliffs,' the illustrations for which were also certainly not taken at Bempton. In this we learn that 'the Guillemot's eggs vary in size and marking.' The author has omitted to state that they usually have shells. 'Often very small eggs are found, but these, I think, are laid by young birds.' We were not previously aware of the protective colouring of these eggs, but 'as the chalk cliffs are all splashed with black and tufts of grass are seen sticking out of the face of the cliff wherever it can find a place to grow, so it takes one *well used to finding the eggs before they can be made out properly*, unless the ledge happens to be near the top of the cliff, when the eggs can be seen plainly.' And all this from a source that quotes 'unnatural history' from the press. But perhaps the most unexpected piece of gossip is 'the reason the Guillemot's egg is so pointed is that if the bird leaves the egg in a hurry, or if a strong wind is blowing the egg, instead of rolling off the ledge as an ordinary shaped egg would do, simple [sic] *spins round on the point*'!!

#### THE DESCENT OF DARWIN.

It is perhaps not generally known that Hull can claim an ancestor of Darwin as a former mayor. In 1707 and again in 1720, Erasmus Darwin was mayor of Hull; and he was buried at Hull in 1737. This Erasmus Darwin married Elizabeth Mason, aunt to Wm. Mason, Poet and Divine. His connection with Charles Darwin is set forth on a pedigree of the Darwin family, printed by Sir Albert K. Rollit, in Wildridge's 'Northumbria,' 1888, pp. 138-140.

## THE BRITISH ASSOCIATION REPORT.

The Report of the British Association for the meeting held at Dublin in September last was published as we were going to press with our May number. This is eight months after the meeting, notwithstanding the fact that practically all the volume was in type at Dublin. Surely the paging, indexing, and binding of the volume should not take so long. We are now thinking of the next meeting at Winnipeg, and at this late date the Dublin volume has lost much of its value. Now that the British Association has got a new Secretary, dare we express the hope that he will hurry forward the publication of these reports?

## THE SOLITARY ANT

In his paper on 'Glacial Survivals,' which appeared in this journal for August and September 1907, Mr. F. Elgee made frequent reference to that interesting specimen, the Solitary Ant



Solitary Ant.

(*Mutilla europæa*), which occurs in North-East Yorkshire. The illustration herewith is an enlarged photograph of a female Solitary Ant, the second Yorkshire example, from the moors near Robin Hood's Bay. This will enable our readers to recognise the species should they come across it.

## A PRIMITIVE DREADNOUGHT.

In this journal for June 1905 we gave an illustration of the pre-historic boat at Brigg, Lincolnshire, which had reposed buried in the clay for two thousand years or more, until unearthed during the construction of a gasometer. It then

became the subject of an expensive lawsuit, decided in favour of the Lord of the Manor. It was next, at considerable cost, removed to a special brick building near the railway station, where, with its prominent label 'pre-historic boat; admission 6d.', it has formed quite a feature in that little market town for over twenty years. It has now made its last voyage, having been presented to the Hull Museum by Mr. V. Cary-Elwes, D.L., J.P., F.S.A., together with several relics that were found with it. It is carved from a single trunk of oak, over forty-eight feet long, and it is safe to say that no such tree lives in England to-day.

## OSPREY IN YORKSHIRE.

W. H. ST. QUINTIN, F.Z.S., ETC.

AN Osprey spent the whole of Friday, April 30th, at Scampston. He was seen from early morning till dusk, but he was gone the next day when looked for. Though he was followed by a noisy crowd of rooks and jackdaws whenever he moved, he was constantly on the wing over our lake, fishing, and several times was seen to take a fish, probably roach, though there are a few trout, and perch.

In view of the lamentable condition, as a breeding species, to which the Osprey has been reduced in these islands, it is interesting to note that individuals may still be found in spring time, winging their way north towards their old breeding grounds, and it is to be earnestly hoped that those who are in a position to do so, will do their best to ensure them security.

On the 9th of last month I saw an Osprey at Hyeres [South France], close to the old chateau. It was about 3 miles from the sea, and he was circling with lazy flaps with the wind, not more than 200 yards high as I reckoned, towards the forest which I had just left.

With the natural eye I could see something bulky in his feet, and with the glass could distinctly make out a good-sized silvery fish, probably a grey mullet, which abound in the neighbouring brackish lagoons.

In 1891 an Osprey stayed at Scampston for fully six weeks. He first appeared in mid-July, and was in moult, being probably a bird that had failed to find a mate, and was not breeding. He became quite reconciled to persons in full view, if they did not behave suspiciously. I once saw





Yrs very truly

W. C. Hey

---



'long-leg' in a village cricket-match not more than 150 yards from the Osprey sitting on an old stag-headed birch tree. I repeatedly saw this bird catching his fish, and noticed how very much a slight ruffle of breeze seemed to interfere with his success. On windy days he would have to work hard, flying for a long time without a chance, and then frequently missing his quarry. After a meal he would, from a low 'pitch,' make frequent plunges, one after another, to cleanse his plumage, as I have seen a Kingfisher do for the same purpose.

---

### **In Memoriam.**

WILLIAM CROSER HEY.

(1853-1909).

(PLATE XII.).

OUR readers will learn, with deep regret, of the death of the Rev. W. C. Hey, which occurred quite suddenly and unexpectedly at West Ayton on May 19th. Mr. Hey was taken ill on the preceding afternoon at Forge Valley Station, whilst on a botanising excursion.

He was the son of the late Ven. Archdeacon Hey, Canon Residentiary of York. He received many honours at Oxford, and his first curacy was at Guisborough, where he remained till 1879. He then went as curate to his father at St. Olave's, York, and succeeded him in the living in 1883. In 1892 he retired into private life, since which date he has lived at West Ayton.

He was a keen botanist and conchologist, and has contributed many papers thereon to this journal and elsewhere. His studies were not confined to these particular branches, however, and geology and the Hymenoptera also received his attention, papers on these subjects being printed by him.

He was a frequent contributor to this journal, his last note appearing even so recently as in the April number. His writings possessed an exceptionally charming literary style.

Mr. Hey was of a retiring disposition, and usually went his rambles alone, or in the company of one friend. He now and then attended the excursions of the Yorkshire Naturalists' Union, the last occasion being on the Filey meeting in Whit week-end in 1903. Only a few days before his death we received a letter from him respecting some Hymenoptera he was trying to get for us.

By his will he leaves £20., free of duty, to the Yorkshire Naturalists' Union, of which he has been a member since its foundation.

T. S.

# THE AMMONITES CALLED *A. SERPENTINUS*.

(PLATES XIII., XIV. and XV.).

C. THOMPSON, B.Sc. (LOND.),  
Hull.

WHEN engaged in research in regard to certain ammonites, I asked Mr. Crick of the British Museum (Natural History) if there were any real differences between Reinecke's '*serpentinus*' and Sowerby's '*falcifer*.' I was at once gratified by having the literature on the subject placed at my disposal by the officers of the museum.

A glance at Reinecke's beautiful figure was sufficient to show that the usual identification of *A. serpentinus* was incorrect, so I reported to the Hull Geological Society the published results of Mr. Buckman's work of twenty years ago. Recently a question by Mr. Sheppard, regarding the Yorkshire specimens, set me at work again.

I have been led to the conclusion that the Yorkshire fossil usually called *A. serpentinus* is certainly not that species. It might be correct to label it *A. mulgravius*, Y. and B., but the question is whether that species is really distinct from *A. falcifer*, Sowerby.

Mr. Buckman informs me that the authorities of the Whitby Museum have kindly placed Young and Bird's type of *A. mulgravius* in his hands for study; that it is a large shell about 235 mm. in diameter, with inner whorls very like Sowerby's *A. falcifer*.

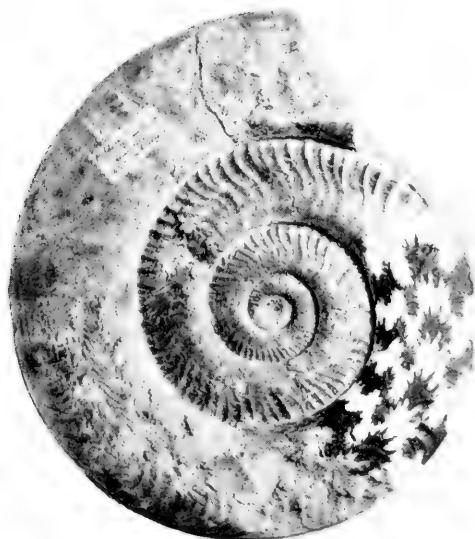
I have sent him a photograph of Sowerby's species, and he reports to me as follows:—'The comparison of Sowerby's small *falcifer* with Young and Bird's large *mulgravius* is difficult, because the inner whorls of the latter are so much hidden. Both species show in the inner whorls a stage of somewhat strong, broadly-flattened, primary furcating costae preceding the stage of regular, narrow, non-furcating costae.

In *falcifer*, the primary costae of the first stage are more distinct than in *mulgravius*, and the regular costae of the second stage also appear to be coarser. In *falcifer* the umbilicus is larger than in *mulgravius*, and this distinction would increase with age, while the umbilicus of *falcifer* is certainly deeper, which means that its whorls are thicker than those of *A. mulgravius*.

On these data I am inclined to think that *falcifer* would grow



Copy of Reinecke's original figure of *Am. serpentinus*, (*Hildoceras serpentinum*); from negative lent by Mr. S. S. Buckman. (Very slightly reduced; trans. diam. should be 71 m.m.)



*Hildoceras serpentinum*, (Rein. sp.). From photograph of specimen in the collection of Mr. S. S. Buckman. Photographed by Miss Buckman. (A little over  $\frac{2}{3}$  nat. size).



up to be a thicker whorled, more strongly-costated and more widely umbilicated species than *A. mulgravius*; wherefore though the two forms are evidently closely allied, I think it desirable to retain the two names.\*

The above confirms my own work on the common Yorkshire fossil, the result of which is, that the type described and figured below is the adult of *falcifer*.

The following extract from d'Orbigny† will give the history of the names, and is that author's opinion on the matter:— 'Reinecke, en 1818, a décrit et figuré cette espèce presque adulte, sous le nom d'*Argonauta serpentinus*, et jeune sous celui de *Cæcilia*, dont Schlotheim a fait, en 1820, les *A. serpentinus* et *capellinus*. La même année, Sowerby appelait l'adulte *Strangewaysii*, et le jeune *Falcifer*. Deux ans après, de l'adulte encore, Young et Birds, en 1822, faisaient leur *A. Mulgravius*. Il en résulte que l'espèce a six noms distincts, dont le plus ancien est *Serpentinus*, qu' on doit conserver; ainsi les noms de *Cæcilia*, de *capellinus*, de *Strangewaysii*, de *Falcifer* et de *Mulgravius*, employés quelquefois par les auteurs, doivent être renvoyés à la synonymie.'‡ It appears from this extract that d'Orbigny, following Schlotheim's description of what seems to me to be an intermediate form, figured a specimen much resembling *mulgravius* as *serpentinus*, and suppressed the English name.

Bayle, Wright, Blake, and others, followed d'Orbigny. Confusion arose in consequence, since we had so many names attached at different times to one ammonite, which names had really been given by their authors to various species.

This is exceedingly strange, for Reinecke's figure is so clear and he took the further trouble to give a section of his specimen; Young and Bird, also followed by Simpson, described *mulgravius*, one would think sufficiently well.

The three ammonites under discussion are really unlike one

\* In Litt., May 7th, 1909.

† 'Terrain Jurassique,' t. I., p. 218.

‡ [TRANSLATION—Reinecke in 1818 described and figured this species, almost adult, under the name of *Argonauta serpentinus*, and young, under that of *Cæcilia*, from which Schlotheim in 1820 made *A. serpentinus* and *capellinus*. In the same year Sowerby named the adult *strangewaysii*, and the young form *falcifer*. Two years afterwards, from the adult again, Young and Bird, in 1822, made their *A. mulgravius*. As a result of this the species has six distinct names, the oldest of which is *serpentinus*, which ought to be kept; so that the names, *Cæcilia*, *capellinus*, *strangewaysii*, *falcifer* and *mulgravius*, sometimes used by authors, ought to be relegated to synonymy].

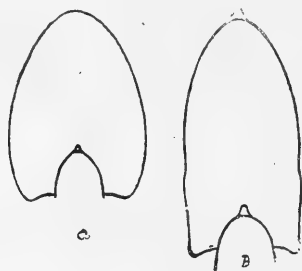
another, especially *A. serpentinus* and *A. mulgravius*, as the accompanying plates alone will show.

Mr. Buckman wrote in the 'Geological Magazine' for 1887, that Oppel, in his 'Juraformation,' p. 243, noticed the blunder and kept both species (*falcifer* and *serpentinus*) distinct; that Dr. Haug, in his 'Beiträge Monog.', 1885, drew pointed attention to the fact of *falcifer* having been generally figured for *serpentinus*; also that Dr. Haug separated *Am. serpentinus* totally from *Am. falcifer*, placing the former in the group of *bifrons*, and so in Hyatt's genus *Hildoceras*. Both Oppel and Haug give *mulgravius* as a synonym of *falcifer*.

Below will be found Sowerby's own description of his *falcifer*, Buckman's description of *Strangwaysi* for those who have never seen the type; and finally, a contrast of the characters of Reinecke's *serpentinus* and of the most common Yorkshire type, which former collectors called *mulgravius*.

It will, however, be seen from the plates and Mr. Buckman's comparison above, that it is not the typical *mulgravius* of Young and Bird, for that does not for one thing possess those coarse broad ribs on the outer whorl.

The following is Sowerby's description of *falcifer*. ('Min. Con.', Vol. III., p. 99) Spec. Char.:—Discoid; radiated;



(a) Section of last whorl of Sowerby's '*falcifer*.' (Natural size.)

(b) Section of last whorl of the adult specimen figured on plate XIV. ( $\frac{1}{2}$  nat. size).

(Both these drawings have been very slightly reduced in reproduction).

radii curved and suddenly bent in the middle; inner volution half exposed; margin convex, carinated; whorls convex on their sides; aperture elliptical.

'The diameter is little more than twice the length of the aperture. The radii are numerous and close together; as they diverge from the centre they turn a little forward, then bend suddenly back, and afterwards proceed in regular semi-circles





(1)



(2)

(1) *Am. falcifer*, Sow. sp. (*Harpoceras falciferum*). (Nearly natural size ; diameter should be 58.5 m.m.)

(2) *Am. strangwaysi*, Sow. sp. (*Harpoceras strangwaysi*). (Reduced to about  $\frac{2}{3}$  nat. size).

From photographs of Sowerby's *original type specimens* supplied by Dr. A. Smith Woodward.



"*Am. mulgravius*." (?) (Of collectors). Also wrongly named by many "*Am. serpentinus*."

The adult *Harpoceras falciferum* of the foregoing paper. From photograph of Yorkshire specimen in Hull Museum, supplied by Mr. Sheppard. (Reduced to about  $\frac{1}{3}$  nat. size).





*Harpoceras mulgravium*. From photograph of Young and Bird's original type specimen of *Am. mulgravius*.

Block, the copyright of Mr. S. S. Buckman. Photographed by Mr. J. W. Tutchter, Bristol. (Reduced to about  $\frac{1}{3}$  nat. size).



to the margin, somewhat resembling the curve of a reaping-hook. The inner edge of the turns is elevated and obtuse. This nearly resembles the last [*A. strangwaysi*], but is not so flat, and wants the flat surface of the inner margin of the whorl. It is from the Inferior or Iron-shot oolite of Ilminster.

The following is the description of *Harpoceras Strangwaysi* (Sowerby sp.), from Mr. Buckman's paper :—'Discoidal, compressed, hollow carinate ; whorls flattened, with genuine sickle-shaped ribs, less conspicuous on body chamber, but there more distinctly bent. Ventral area marked by prolonged sweep of ribs and surmounted by a well-marked hollow carina. Inner margin, almost upright, neither convex nor concave. Umbilicus shallow, open. Inclusion about one third ; aperture oblong. Sowerby's figure not correct. Inner margin wrong, sectional view wrong. Ribs do not bend enough since they should have a true sickle-shape. His suture lines are right.'

'*Harpoceras Strangwaysi* differs from *Harpoceras falciferum* in having a more open umbilicus, about one-fourth larger ; ribs are not quite so curved, and inner margin is nearly upright instead of undercut. Fish bed, Upper Lias, Byfield, Trent ; Ilminster, Sowerby.'

A contrast of the characters of the other two types :—

*A. mulgravius*. (?) (Of collectors).

PLATE XIV.

The shell has a very flat and discoidal appearance. The whorls are broad ; the outer one being in the earlier stages of life nearly half the diameter of the shell. In early life, too, each whorl is rather deeply indented by the preceding one, but one of the characteristics of the species is, that the amount of inner whorl covered by the outer one continually decreases with age, until in the last stage the body whorl covers a little more than a quarter of the preceding one.

Therefore the relative size of the umbilicus to the whole shell is continually increasing with age.

In consequence of the flatness of the inner third of each whorl, the umbilicus descends to the centre by a number of broad flat steps.

The inner margin of the whorl is also characteristic, being undercut, or, if it be preferred, it slightly overhangs the preceding one. In

*Hildoceras serpentinum*.\*

PLATE XIII.

This also has a flattened and discoidal appearance, but the whorls are not so broad as in *mulgravius*, nor Sowerby's *falcifer* ; roughly three-quarters for the same sized shell.

The umbilicus is large and open, for the whorls enclose very little of each preceding one. The coiling is regular ; that is, the amount of involution does not vary with age as in the species compared with it.

The inner margin is obliquely flattened, the slant being down towards the centre of the shell, not away from it.

\* Description mainly from Mr. Buckman's paper.

the very young, the whorls are elliptical in section, then for a very short distance the inner edge is vertical, but soon it becomes overhanging, and the section can no longer be said to be elliptical.

A little less than half-way across each whorl is a well-marked longitudinal furrow. On the ventral area (popularly 'the back') is a well-defined septate keel without bordering furrows. A septate keel is one which is separated from the chamber by a ribbon of shell, so that when the keel is knocked off the ventral area appears rounded. This character is well shown by many specimens.

The ornamentation is also characteristic. The ribs are distinctly sickle-shaped. In the young there is a stage in which there are short primary ribs which bifurcate but soon they become single, broad and flat. Passing from the umbilical edge, they curve gently forward, then at the groove, take a sudden bend backward, and at once sweep round in a prolonged curve towards the mouth of the shell, becoming more prominent, broader and rounder as they do so. They then die out at the base of the keel.

In the adult form when the shell is preserved, the ribs are seen to begin at the edge of the umbilicus, almost as narrow elevated lines, each alternate one developing the above character, while the others proceed only about half or two-thirds across the whorl as quite subsidiary, or intervening ribs. This character is not visible in the cast.

In well-preserved and carefully cleaned specimens, the ribs are seen to be present on the slanting wall of the umbilicus, and pass *backward* at an angle of about 30°, but turn sharply forward on the very edge of the whorl, to take the direction given above.

The suture lines are very much foliated, being deeply indented by narrow accessory lobes. They crowd one on the other, so that even in young shells no larger than 30 mm. they actually overlap.

The external or ventral saddle has the prominent deep accessory lobe characteristic of the genus *Harporoceras*.

Has no longitudinal furrow on the sides of its whorls.

The keel is non-septate, so that the mould is exactly the same shape as the shell; the mud filling the keel which is entirely open to the chambers. Two slight furrows border the keel, but die away on the body whorl.

The ribs are sigmoidal, almost exactly like the letter 'S.' Not very plain on inner margin.

The suture lines are much simpler, they are rather remote, or distant from one another, and resemble those of '*bifrons*' very closely.

To sum up, *Am. serpentinus*, (Rein. sp.), *Am. falcifer* (Sow. sp.), and *Am. strangwaysi*, (Sow. sp.) are distinct species. In Yorkshire, we appear to have two forms—one very common, which seems to be the adult of *falcifer*, and therefore would be named *Harpoceras falciferum*, the other, an allied form, which should be kept distinct under the name *Harpoceras mulgravium*.

It is my most pleasant duty to thank Mr. Buckman, who, with generous self-sacrifice, has placed at my disposal the materials for the first plate, and especially for his advice; Mr. J. W. Tutchter, for the use of his valuable photograph of Young and Bird's type, which was needed to complete the paper; Dr. A. Smith Woodward, for the very necessary photographs of Sowerby's types, and for the use of the British Museum (Natural History) Library; Mr. Sheppard, for the photograph of the Yorkshire specimen in his charge at the Hull Museum; and Mr. J. W. Stather and Dr. Walton, for procuring for me some of the requisite literature.

It is obvious that without this generous help the present paper could not have been prepared.

I wish also to thank the editors for so liberally illustrating the paper, and so enabling photographs of all the types under discussion to be seen together for the first time.

#### LIST OF WORKS OF REFERENCE FOR ABOVE PAPER. 4

- 1818, Reinecke, I. C. M.—'Maris protogaei Nautilus et Argonautas,' etc.  
 1820, Schlotheim, E. v.—'Die Petrefactenkunde,' etc.  
 1820, Sowerby, J.—'Min. con.,' Vol. III., p. 99, t. 254.  
 1822, Young, G. and Bird, J.—'A Geological Survey of the Yorkshire Coast.'  
 1842-49, Orbigny, A. d'.—Paléontologie Française. Terrain Jurassique, t. I.  
 1876, Tate, R., and Blake, J. F.—'The Yorkshire Lias.'  
 1878-86, Wright, T.—'Monograph on the Lias Ammonites.'  
 1884, Simpson, M.—'The Fossils of the Yorkshire Lias,' 2nd Edition.  
 1887 and 1889, Buckman, S. S.—On Jurassic Ammonites, 'Geol. Mag.', dec. III., Vol. IV., p. 396; and Vol. VI., p. 200.



We have received 'Book Auction Records' (Vol. VI., part 1), published by Karslake & Co., London. This book is issued quarterly at a subscription of £1 1s. per annum. The part before us contains 3383 records of sales made during the quarter ending December 31st, and from the numerous details given relative to each lot, is a most useful guide to the librarian or private collector. The present number contains 'Notes on Hull Authors, Booksellers, Printers and Stationers, etc.', by Mr. W. G. B. Page.

## RECENTLY DISCOVERED FUNGI IN YORKSHIRE.

C. CROSSLAND, F.L.S.

*(Continued from page 182).*

PENIOPHORA HYDNOIDES Cke. &amp; Mass.

N.E.—Osmotherley, on dead branches. (\*'Nat.', Nov. '08, p. 410). [To follow No. 1185].

TYPHULA GRACILIS Berk. and Desm.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 26). [To precede No. 1248].

PUCCINIA PERPLEXANS Plow.

Æcidiospores on *Ranunculus acris*.

S.E.—Hornsea. (\*'Nat.', Aug. '08, p. 310)

[To precede No. 1348].

HYPOCREA STROBILINA Phil. &amp; Plow. Grev. XIII., p. 79.

N.E.—Osmotherley, on decaying pine wood. (\*'Nat.', Nov. '08, p. 410). [To follow No. 1434]

EUTYPA SCABROSA (Bull.) Fckl.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 26). [To follow No. 1553].

LOPHIOSTOMA ARUNDINIS (Fr.) Ces &amp; De Not.

S.E.—Hornsea, on dead stems of *Phragmites communis*. (\*'Nat.', Aug. '08, p. 310). [To follow No. 1622].

RAPHIDOSPORA ULNASPORA.

N.W.—Brafferton, on dead nettle-stems. (\*'Nat.', July, '08, p. 284). [To follow No. 1642].

HEPTAMERIA GRAMINIS Fckl.

N.E.—Terrington, on *Phragmites communis* (Grev. Mar. 1890, XVIII., p. 59). This record was accidentally overlooked when the 'Y.F.Flo.' was compiled.S.E.—Hornsea, on *Phrag. communis*. (\*'Nat.', Aug. '08, p. 309). [To follow No. 1469].

TAPESIA FUSCA var. prunicola.

Mid. W.—Buckden, on *Prunus communis*. June '06, Thos. Hebden.

GLÆOSPORIUM PODOGRARIA Mont. &amp; Desm.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 27). [To precede No. 2281].

OOSPORA FULVA Sacc. and Vogel.

S.W.—Among moist cotton on which date stones were being germinated, The laboratory, W. R. River's Board, Wakefield. April 1908. J. W. H. Johnson. [To follow No. 2298].

ASPERGILLUS NIGER Van Teigh.

S.W.—Thornhill, near Dewsbury. On dates; probably introduced with the fruit. Was successfully cultivated on *prune agar* medium, by J. W. H. Johnson, Thornhill, April '08.

ASPERGILLUS GRISEUS Link.

S.W.—Wakefield, in the laboratory. W. R. Rivers' Board, on Petri dish culture of bacteria. Mar. '08, J.W.H.J. [To follow No. 2318].

PENICILLIUM HYPOMYCETIS Sacc.

S.W.—Firbeck, spreading over a group of *Trichia fragilis*. (F.F., 1905. Accidentally omitted). [To follow No. 2320].

OVULARIA INTERSTITIALIS (B. & Br.) Mass.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 27). [To follow No. 2342].

TORULA EXPANSA Pers.

N.W.—Brafferton. On decaying nettles. (\*'Nat.', July '08, p. 285). [To follow No. 2371].

PERICONIA PYCNOSPORA Fres.

S.E.—Hornsea. On dead herbaceous stems. (\*'Nat.', Aug. '08, p. 310). [To follow No. 2381].

MENISPORA CILIATA Corda.

N.E.—Osmotherley. On dead decorticated wood. (\*'Nat.', Nov. '08, p. 411). [To follow No. 2391].

CLADOTRICHUM COOKEI Sacc.

N.E.—Osmotherley. On dead wood. (\*'Nat.', Nov. '08, p. 411). [To follow No. 2401].

MACROSPORIUM COMMUNE Rabh.

S.E.—Hornsea. On grass. (\*'Nat.', Aug. '08, p. 310). [To follow No. 2427].

TUBERCULARIA BRASSICÆ Lib.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 27). [To follow No. 2460].

LAMPRODERMA ECHINULATUM Rost.

Mid. W.—Buckden. On rotten wood. A. R. Sanderson, Bradford, 1908. [To precede No. 2508]

# ADDITIONAL HOSTS.

PUCCINIA ORCHIDEARUM-PHALARIDIS Kleb.

ÆCIDIUM on *Listera ovata*.

S.E.—Hornsea. (\*' Nat.', Aug. '08, p. 310). [To follow No. 1399].

P. RUBIGOVERA.

ÆCIDIUM on *Lycopsis arvensis*.

S.E.—Hotham Cross, near South Cave. R. H. Philip. (' Trans. Hull Sci. and F.N.C.', May '08, p. 22).

' Mr. Hawley informs me that in 1907 he found this Æcidium on *L. arvensis* plentifully at Tumby, Lincs., early in September, and that he had not seen it previously.'—(R. H. P.).

PERONOSPORA SPARSA Berk.

Mid. W.—Grassington, on living leaves of *Poterium officinale*. (F.F., 1907).

# CONFIRMATION OF DOUBTFUL RECORD.

GEASTER RUFESCENS.

When the ' Y. F. Flo.' was compiled, the record of this species for Pond Wood, near Boynton (' Nat.', July 1889, p. 192) was considered doubtful, and so bracketed. In October 1907, a fine species of undoubted *G. rufescens* was found on bare soil under a sycamore tree, by the gardener in the grounds of Mr. Whitley Thompson, Skircoat, Halifax. V.C.S.W.

NAUCORIA NUCEA (Bolton) Sacc. (' Nat.', '08, p. 385).

# NOTES ON A HUMARIA AND A GORGONICEPS.

On December 10th, 1908, Mr. Wilfred Robinson, Hull, sent me a few ascophores of a discomycete, gathered on soil in the Hull Dock Reservation. They come near *Humaria Chateri* in general appearance, but differ in the spores being much larger and more coarsely tuberculate than one would be given to understand by the English descriptions. ' Phillip's Brit. Disc.', p. 89, gives the spores of *Chateri* as '*biguttulate, asperate*,  $12 \times 5 \mu$ ,' and quotes ' Gard. Chron.', 1872, p. 9, with figure ; ' Jour. Bot.', 1872, p. 86 ; ' Grevillea L.', p. 120, p. 8, figs. 1 and 2 (reproduced from ' Gard. Chron.'). Massee Vol. IV., p. 405, says :—'*epispore minutely reticulated*,  $13-16 \times 7-8 \mu$ . The spores of the Hull ascophores are  $20-21 \times 9 \mu$  (no guttæ were observed) ; Boudier, to whom specimens were submitted, considers them even larger still ( $22-25 \times 11-13 \mu$ ), and remarks, ' very near



*Chateri*, but differs in the spores being larger, and the hairs thicker. It may be a variety of this very variable species, or, the shape of the spores and hairs may indicate a different species.' Boudier places *H. Chateri* in his genus *Melastiza*. Dr. Rehm, in 'Rabh. Kryt. Flo. (Disc.) p. 1059, places it under *Lachnea*. According to our idea it comes between *Lachnea* and *Humaria*. Rehm gives the spores of *Chateri* '1-2 guttulate, coarsely warted,  $15-20 \times 9-10 \mu$ '; asci  $200-250 \times 12-14 \mu$ ; ours are  $280-320 \times 12-14 \mu$ . Saccardo refers to German and Italian forms with spores  $16-17 \times 7-8 \mu$ .

Although doubtful, all points considered, perhaps it will be best to leave it with *Chateri* at present. The Hull specimens have been carefully figured and described.

*Gorgoniceps Guernisaci* (Crouan) Sacc. var. *vibrisseoides* Mass.

*Helotium vibrisseoides* Peck, '32nd Report,' 1879.

*Vibrissea turbinata* Phil. 'Trans. Linn. Soc.', 1881.

*Gorgoniceps vibrisseoides* Sacc. 'Consp. Gen. Disc.', p. 7; 'Syll.', VIII, p. 505.

*Apostemidium vibrisseoides* Boud. 'Ann. Myc.', 4; 200, 1906; 'Disc. Eur.', p. 91 (1907); Durand, the Geogloss. 'North America Ann. Myc.' (Berlin, 1908) VI., pp. 457-8, pl. XI., figs. 119-120. On dead branches, near small waterfall, in hill-side rill, High Greenwood, near Hebden Bridge, August 1904, Dr. Durand, J. Needham and C. C.

As will be seen above, this variety has been considered by several mycologists to be a distinct species. In my opinion, Massee ('Brit. Fung. Flo.', IV., pp. 488-9) is quite right in placing it under *G. guernisaci* as a variety. Characters confined solely to the paraphyses, such as their more or less profuseness, presence or absence of a slight brown tinge at their apices, or their varying from simple or occasionally forked to repeatedly forked towards their tips, scarcely justify the raising of a variety to a species.

ERRATA.—Delete 'var. *sclerotiorum*, on decaying herbaceous stems,' Topcliffe Excursion. ('Nat.', '08, p. 285).

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In *Knowledge* for May, Mr. W. G. Clarke writes on 'Striæ on Neolithic Flint Implements.' In this he points out that humanly worked surfaces of the flints are scratched and 'our geological knowledge affords us no other possible course of these striæ than glacial action.' This means that neolithic man must have existed during or before the Ice Age. We don't believe it!

## SERMONS IN STONES.

**The Stone Ages in North Britain and Ireland**, by the **Rev. F. Smith**. Blackie & Sons, 377 pp., 16/- net.

There is no doubt that this is one of the most remarkable books that has appeared during the present century. At first we thought it must be a reprint of a work originally published about 1750. But it is not. The 'Dedication' is a novelty anyway. It begins, 'During the forty years many friends come and go,' and the author forthwith proceeds to 'dedicate' to a whole army of naturalists, etc., past and present. And then Dr. A. H. Keane eulogises Mr. Smith, and refers to his extraordinary work. Apparently largely to Dr. Keane's influence, the present book has made its appearance. In this we are not quite sure whether Dr. Keane has acted well for Mr. Smith. He concludes by designating Mr. Smith 'the Boucher de Perthes of Scotland,' though we think 'Boucher de Purth' would have been better.

In his quest the author is, admittedly, very largely alone. The late Sir John Evans, referred to as 'doubting Thomas,' and several other authorities who have restricted their collections to 'orthodox forms,' do not see eye to eye with Mr. Smith. But that is evidently their misfortune.

Mr. Smith is obviously an enthusiast, and is not damped by any amount of cold water. His reception at the British Association, at University Museums, and other trivial places of a like character, have not proved encouraging; yet he has gone on. He is one of those who sees weapons in the running brooks, flayers in stones, and implements in everything. He has spent forty years in picking up weapons and tools in places where the bigoted specialist would not look. Mr. Smith searches the boulder clay, the old river gravels, the beds of streams, and the sea shore. All these localities have yielded scores and scores of 'weapons' to him. He has found three hundred palæoliths in Scotland, also mullers, flayers, knives, choppers, clubs, etc. He is very strong on 'handles.' A pebble or a boulder, narrower at one end than the other, is provided with a 'handle.' Usually those found in streams or on the beach are 'mellow' with age. What an ordinary mortal would look upon as cleavage planes or ordinary natural fractures, to Mr. Smith are 'boldly struck flakes.' A stone shaped like a scapula is proved to be a palæolithic implement by the author providing illustrations of shoulder-blades in the Dublin Museum. Jaw-bones, etc., are used in the same way. And the implements Mr. Smith finds are not restricted to flint; they can be made from basalt, granite, sandstone, limestone—in fact, from any rock that is subject to wear and tear in a stream or on the beach. 'Fig. 45 is a boldly struck-out specimen, which, so far as one can judge (for it is highly [sic] rolled), was fashioned from a yet more highly rolled stone—one so rounded that we should have called it a pebble. Fig. 40 is of the same type of work, but it was wholly sculptured out of a mass of basalt. This last is scarcely at all water-worn, but is mellowed and minutely honey-combed in the usual way by long submergence at the bottom of the sea, and has lost its point. This is an Ayrshire-coast specimen.'

Quite a large proportion of his specimens have lost their points, or sides, or both, and these are shewn in the very excellent drawings by 'restorations.' From these it is pretty clear that had Mr. Smith's palæoliths been perfect when found, they would have been tolerably good neoliths. Size is no object. One beach-specimen was so weighty that a cab had to be requisitioned. Then the question arose as to what use such an implement could be? Only Mr. Smith could have solved it. The weapon was a guillotine trap! It was hung by a cord on a tree. The mammoth passed underneath, snapped the cord, down came the weapon, and the elephant died! Here and there a fairly passable implement is figured—one somewhat approaching the 'orthodox' type, but,

with the author's extraordinary bad luck, such specimen has generally been lost or stolen. Two unexpected but not surprising illustrations occur in figs. 308 and 309. These represent the front and side views of the fractured lias nodule found in the boulder clay at Scarborough a year or two ago, which was to have formed the subject of a paper on 'Glacial Man in Yorkshire' at the British Association Meeting at York, but didn't. In the present work it is recorded as from the 'Lower Trias,' and was found at Sewerby, but we recognise it all the same. Like Mr. Smith, the present writer examined it several times. Mr. Smith calls it 'a more than usually fine specimen,' and a 'magnificent specimen of pre-glacial man's handiwork.' In the opinion of the present writer, this unusually fine implement is a perfectly natural nodule, and was not touched by man till picked up 'with difficulty'! out of the boulder clay at Scarborough. And as Mr. Smith admits it is one of his best pieces of evidence, he confirms the impression already stated by an examination of his drawings, viz., that his specimens are practically all perfectly natural forms, which, in Mr. Smith's eyes, seem to shew some semblance to weapons. There is no doubt that a brief search upon any beach, or in any river bed would yield dozens of such specimens as Mr. Smith figures—in fact, he admits it himself.

There is one direction in which Mr. Smith has neglected his subject, and we would commend the matter to him in case a second edition of his book is called for. In streams, and gravel pits, and on the beach, are numerous egg-shaped stones, sometimes quite 'mellow.' May not palæolithic man have kept pigeons and chickens, and may not these be his pot eggs? And how do we know he didn't play golf?

In his early remarks the author states 'May I hope that the substance of this volume will prove a revelation to the scientific world? It has been such to myself.' And it has been to us. The volume weighs three and a half pounds, and there is no index.

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## FUNGI.

***Geaster fornicatus* in Lincs.**—Mr. F. Mills sends two fine specimens of this curious fungus from Torksey. They bear a strong resemblance to children's dolls, or models of the pigmies who chipped the small flints! Mr. Peacock records some taken in Bottesford Parish in 1869, and one since, I think, from Torksey. Is it 'comparatively rare,' or easily overlooked on account of its protective colour?—W. FOWLER, May 5th, 1909.

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## GEOLOGY.

**Vertebra of Codfish in the Holderness Gravels.**—A vertebra from the glacial gravels at Kelsey Hill, found by Mr. George Sheppard, has been kindly identified by Mr. E. T. Newton, F.R.S., as that of a cod-fish. This is an addition to the fauna from this deposit, though the species has been recorded from the pre-glacial beach at Sewerby.—T. SHEPPARD.

## SOME NEW BOOKS ON EVOLUTION.

The recent commemoration of the Centenary of the birth of Charles Darwin, and of the fiftieth anniversary of the publication of *The Origin of Species* has resulted in the appearance of a number of treatises on Evolution, some of which have already been noticed in these columns.

To the Cambridge University Press, however, is due the credit of producing the most valuable, most complete, and we may say the most generally interesting volume. It is entitled **Darwin and Modern Science**, and is edited by **Prof. A. C. Seward**. (595 pp., 18/- net). We should like first to record our thanks to Prof. Seward for being so instrumental in placing before the world this magnificent work; not only has he edited the volume, but he has translated some of the articles which were written in German.

*Darwin and Modern Science* is the outcome of a suggestion made by the Cambridge Philosophical Society to publish a series of essays as a record of the celebrations, and in the twenty-nine chapters contained in this volume is certainly the most authoritative and comprehensive survey of the influence of Darwin's work that has ever been made. Each essay has been specially written, and in most cases, the services of the very best person has been secured. An idea of the variety and scope of the volume can be ascertained from the following essays selected aphazard. 'The Selection Theory,' Prof. Weismann; 'Variation,' Prof. Hugo de Vries; 'Chas. Darwin as an Anthropologist,' Prof. Ernest Haeckel; 'The Influence of Darwin on the Study of Animal Embryology,' Prof. Sedgwick; 'The Value of Colour in the Struggle for Life,' Prof. Poulton; 'Geographical Distribution of Plants,' Sir William Thiselton-Dyer; 'Geographical Distribution of Animals,' Prof. Hans. Gadow; 'Darwin and Geology,' Prof. Judd; 'Mental Factors in Evolution,' Prof. C. Lloyd Morgan, and 'Evolution and the Science of Language,' by Mr. P. Giles. Amongst other contributors we find Sir Joseph D. Hooker, Prof. J. Arthur Thomson, Prof. W. Bateson, Prof. E. Strasburger, Prof. G. Schwalbe, Mr. J. G. Fraser, Prof. W. B. Scott, Prof. W. H. Scott, Prof. G. Klebs, Prof. J. Lock, Mr. Francis Darwin, Prof. Goebel, Prof. H. Höffding, Prof. G. Bouglé, the Rev. P. N. Waggett, Miss Jane Ellen Harrison, Prof. J. B. Bury, Sir George Darwin, and Mr. W. C. D. Whetham.

What could be a more fitting monument to the memory of Darwin than the collected tributes of these well-known writers? And what could be more welcome to the professor or to the layman than this summary of the present attitude of our leaders in scientific thought with regard to Darwin's teaching? We are glad to learn that any profits from the sale of this volume are to be handed over to a University Fund for the Endowment of biological research; the best wish we can express is that the volume may meet with the success it deserves.

**Life and Evolution**, by **F. W. Headley**. Duckworth & Co., 272 pp., 5/- net. The fact that this volume has reached a second edition speaks for itself. It is the outcome of a series of lectures delivered by the author; the style is pleasant, and the illustrations are numerous, and for the most part good, though some are rather crude. The book is in nine sections, viz., Plants and Animals; The Sea and its Inhabitants; Gills and Lungs; Reptiles and their Kin; from a Reptile to a Bird; The Flight of Birds; The Minds of Man and Animals; The Struggle for Existence, and Natural Selection. The sections dealing with birds and their flight, etc., are especially complete, and seem to indicate that the author is perhaps most 'at home' with that part of the subject. The book is well produced, and is certainly very cheap.

**The Transformations of the Animal World**, by **Charles Depéret**. Kegan Paul, Trench, Trübner & Co., 360 pp., 5/-. We are delighted to find that the well-known International Scientific Series is to have a new lease of life,

and that under the editorship of Mr. F. Legge, a further series is to be published, in uniformity with the well-known red-backed volumes which served so useful a purpose a quarter of a century ago. It is also appropriate at the present time that one of the first new volumes should deal with the evolution of the theories on evolution; and such is Mr. Depéret's book, being really the authorised translation of *Les Transformations du monde Animal*. It cannot be said that M. Depéret exaggerates or over-estimates the part Darwin played in the doctrine of evolution; and in the present work there is an unusually complete account of earlier and later workers in the same field. In his preface the editor asks, 'Does the study of fossils offer us any example of a regular chain of animal forms shewing the gradual transformation of one type into another? Or, is natural selection the only means that Nature employs to produce variations? To such questions the teaching of Darwin, as he left it, hardly suggested an answer.' The present work makes a special point of these questions.

**Haeckel: His Life and Work**, by Prof. W. Bölsche. Watts & Co., 128 pp., 6d.

The Rational Press Association has issued a new and revised edition of 'Haeckel's Life and Work,' and, as it can be obtained for six coppers, it should be widely read. It is well written, and is an education in itself. The translator, Mr. Joseph McCabe, gives an introduction and a supplementary chapter. Haeckel is a worker who has been greatly misunderstood, and a perusal of this book will do much towards giving one a better and more accurate idea of the man and his teaching.

**Mendel's Principles of Heredity**, by W. Bateson. Cambridge: The University Press, 396 pp., 12/- net.

We learn from the Preface that 'the object of this book is to give a succinct account of the discoveries in regard to Heredity made by the application of Mendel's method of research. Following a clue which his long lost papers provided, we have reached a point from which classes of phenomena hitherto proverbial for their seeming irregularity can be recognised as parts of a consistent whole. The study of Heredity thus becomes an organised branch of physiological science, already abundant in results, and in promise unsurpassed.'

Most of our readers will be familiar with the thorough manner in which Prof. Bateson does any work he takes in hand, and in the present instance it can be safely said that he has carried out the object for which the volume was written. Not only has he given a careful and detailed account of the present position of the questions of heredity as a result of the influence of Mendel's work, but he has reprinted Mendel's two papers, and has supplied a biographical notice. There is also a bibliography of papers, etc., bearing upon the subject, which exceeds three hundred entries—evidence alone of the importance of this subject in recent years. A perusal of the book convinces us of the force and truth of the author's remark that 'Had Mendel's work come into the hands of Darwin, it is not too much to say that the history of the developments of evolutionary philosophy would have been very different from that which we have witnessed.' Perhaps the most surprising feature in the volume is the extraordinary number of objects, zoological and botanical, which are referred to in connection with the theory. We find peas, barley, primulas, canaries, moths, fowls, sheep, mice, etc. The coloured illustrations of some of these objects, shewing the results of experiments, etc., are surely as nearly perfect as it is possible to make them. Those of the sweet peas and moths particularly call for comment on account of their excellence. As is the rule with publications issued by the Cambridge University Press, misprints are almost absent; but in the one item appearing under 'corrigendum,' line 18 should read line 19.

# THE PRESENT STATE OF OUR KNOWLEDGE OF CARBONIFEROUS GEOLOGY.

DR. WHEELTON HIND, F.R.C.S., F.G.S.

(Continued from page 170).

## BELGIUM.

In Belgium the Visean Limestones have long been known to yield a characteristic fauna, now recognised as corresponding very perfectly with that of the Upper *Dibunophyllum* zone. In the Valley of the Meuse and Sambre, and at Clavier, these beds are succeeded by a Series of black shales, cherts, and thin limestones, which yield a characteristic Pendleside fauna. A fine section at Bioul, North-west of Dinant, shews the junction of the *Dibunophyllum* zone and Pendleside Series. The passage is a gradual one from a lithological standpoint, limestones gradually becoming replaced by shales.

The Pendleside fauna I obtained here in a short time is as follows :—

*Listracanthus beyrichi*.  
*Phillipsia* sp.  
*Chonetes* aff. *Laguessiana*.  
*Camarophoria papyracea*.  
*Productus plicatus* Sarres.  
*Spirifer bisulcata*.  
*Athyris planosulcata*.  
*Orbiculoidea nitida*.  
*Lingula mytiloides*.

*Posidonomya membranacea*.  
*Posidoniella laevis*.  
*Pseudamusum fibrillosum*.  
*Glyphioceras* (too crushed to determine).  
*Orthoceras striolatum*.  
„ *scalare*.  
*Ostracoda* in abundance.

Some few years ago I was invited by Mr. Dupont, then in charge of the Musée de l'histoire Naturelle at Brussels, to examine and report on fossils collected by officers of the Service du carte from Clavier. Among others, the following typical species occurred :—

*Posidoniella laevis*.  
*Pseudamusa fibrillosum*.  
*Posidonomya membranacea*.  
*Chenocardiola footii*.  
*Prolecanites compressus*.

*Glyphioceras bilingue*  
„ *spirale*.  
*Glyphioceras diadema*.  
*Stroboceras sulcatum*.  
*Phillipsii* cf. *polleni*.

and from shales at Vise, I determined :—

*Posidonomya becheri*.  
*Posidoniella laevis*.

*Pterinopecten papyraceus*.

As long ago as 1881, Dr. Purves in his paper 'Sur la détermination de la Constitution de l'étage houillier supérieur de la Belgique,\*' showed that the Carboniferous Limestone of

\* Bull. de l'acad. Royale de Belgique, 3rd Series, Part II., No. 12.

Belgium was succeeded by a group of beds which he subdivided :—

TERRAIN HOUILLIER.

Gres grossier d'Andenne.

Schistes et Psanimites avec mince couches de houille maigre.

Schistes a Mytilus.

Schistes et Phtanites avec *Goniatites* and *Posidonomya* passant vers le bas au calcaire impur avec Brachiopodes.

Calcaire Carbonifère.

The upper group he correlated with the Millstone Grit Series, and the lower with the Yoredale beds of the Midlands, *i.e.*, the Series now called Pendlesides.

Dr. Purves calls attention to the universal occurrence of this Series in Belgium, now known by the name Namurien, and quite recently in the Mons Coalfield, owing to the driving of exploration galleries, M. Cornet has shewn that the Series is present there.\* He has found there a very large fauna containing the majority of the zonal indices on which I rely for the identification of the various sub-divisions of the Pendleside Series in England. M. Cornet includes in his list :—

*Prolecanites compressus.*

*Posidonomya becheri.*

*P. membranacea.*

*Glyphioceras reticulatum.*

„ *beyrichianum* = *diadema*.

and he then says, discussing the fauna as a whole: 'Telle qu'elle est, la liste qui procede montre l'homotaxie, des conches de Bandour et, par extension, de notre assise des phtanites Hia, avec le *Pendleside Series* que notre confrère anglais M. Wheelton Hind, place a la base du terrain houiller du Lancashire, etc., entre le Carbonifère inférieur et le Millstone Grit.'

In addition to the fauna, Mm. Cornet and Renevier have shewn that the flora which we knew to be associated with the Pendleside Series in the British Isles, is fully represented in Belgium.

Dr. Purves † considers the total thickness of the Namurien Series at Andenne to be 180 metres, of which Le Gres Grossier is 12 metres.

It is of equal importance to note that notwithstanding the much diminished thickness of the Pendleside Series in Belgium, as compared to the Midlands, that the majority of the zone

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\* In Terrain Houilles sans hondle et sa faune dans le Bassin de Couchant de Mons ann de la Soc. Geol. de Belgique t. XXXIII. memoirs, pp. 139-152.

† Sop. Supra cit. p. 24.

forms are present, and we may conclude that sedimentary deposition was much more rapid in the English area than in Belgium, where the thickness of the beds agrees more nearly with that which obtains in the West of Ireland.

### GERMANY.

In Germany, probably because the Culm forms the base of the Carboniferous rocks, and that it rests on Upper Devonian with *Clymenia*, it has always been referred to as Lower Carboniferous, and even considered as the equivalent of part of the Tournaisian of Belgium. I have hinted in several publications that as the fauna was identical with that of the Pendleside Series, and also with the Namurien of Belgium, that the Culm of Westphalia and Nassau must be the representative of that Series.

Last summer, in company with two well-known geologists of this Society, Messrs. Cosmo John and Culpin, we had the good fortune to be conducted over the ground by Prof. Kayser, of Marburg, and to make a detailed examination of his extensive collection of fossils from the Culm.

Unfortunately, nowhere are there any extensive sections in the sequence, and there appear to have been several basins of deposit, in which the lowest bed, as indicated by its fauna, does not always appear to belong to the same zone.

Often the Culm beds repose on a Diabase of Upper Devonian age, which naturally obscures the sequence. The Diabase is intrusive in the *Clymenia* beds of the Upper Devonian, so that the conditions and sequence are very similar to that which obtains in Devonshire.

The beds of Culm at Breitscheid are considered to be the lowest of the Series, and they contain :—

*Prolecanites compressus.*

*Glyphioceras crenistria.*

*Glyphioceras mutabile.*

*Pericyclus virgatus.*

*Brancoceras ornatissimum.*

*Trincoceras hibernicum.*

*Dimorphoceras gilbertsoni.*

*Orthoceras scalare.*

*Orthoceras* cf. *salvum* de Kon  
and Corals.

This is a fauna which indicates the highest Visean or *Dibunophyllum* horizon in Great Britain and Ireland with the type fossil of the passage beds between the *Dibunophyllum* zone and Pendleside Series.

The Breitscheid fossils were obtained from impersistent lenticles of limestone, and as far as I can understand, the fauna has been met with also at Erdbach and Liebstein.



The Middle Culm is more fossiliferous, and is well exposed at Herborn. The Series consist of Calcareous shales, the Posidonien Scheifer, with small nodules, resting on 7-8 metres of black chert, which itself reposes on a Diabase of Upper Devonian age. The succession is as follows :—

Grunwacke or Grit .. ..	100	200 metres.
<i>Posidonomya becheri</i> shales .. ..	20	25 „
Chert .. ..	7	8 „
Upper Devonian Diabase .. ..		

The flora and fauna of these beds is typically that of the Lower Pendleside Series, with the exception that *Pterinopecten papyraceus* has not been found there. I just mention the most important :—

<i>Adiantites antiquus.</i>	<i>Posidonomya becheri.</i>
<i>Glyphioceras.</i>	<i>Orthoceras scalare</i> (often called
<i>Orthoceras striolatum.</i>	with us <i>O. Konincki</i> ).
<i>Aviculopecten losseni.</i>	<i>Actinopteria persulcata.</i>
<i>Camarophoria papyracea.</i>	<i>Listracanthus beyrichi.</i>
and Trilobites.	

This fauna has been described by Prof. V. Kœnen.

I regret to say that I did not visit the Culm of Westphalia, but thanks to Professor Kayser, I was able to study his fine collection of fossils from that area, and with his information as to the sequence, have arrived at the following results :—

Prof. Kayser's collections were from two localities—Hagen and Aprath, near Elberfeld. The general sequence is as follows :—

Flotzeere Sandstein with plants .. ..	2000 metres
Culm tonschiefer with <i>Glyphioceras reticulatum</i> ..	200 „
Dark thin-bedded Limestones, with Hagen fauna	
at base .. ..	200 „
Silicious Limestone, with <i>Goniatites</i> .. ..	50 „
Cherts, with Aprath fauna .. ..	
Phtanites with <i>Prolecanites compressus</i> .. ..	5 „
Devonian Rocks .. ..	

The Apath fauna contains a fauna typical of the very lowest of the Pendleside series.

<i>Nomismoceras rotiforme</i>	<i>Prolecanites compressus.</i>
<i>Trincoceras hibernicum</i>	<i>Productus plicatus</i> Sarres
<i>Pleurodictium dechtanum.</i>	

and, as might be expected, the oldest facies of any fauna in the sequence.

(To be continued).

## YORKSHIRE NATURALISTS AT MARKET WEIGHTON.

On Saturday, May 8th, the members of the Yorkshire Naturalists' Union commenced their 48th year's field work in the county by investigating the country around Market Weighton, where the wolds, dales, commons, woods, quarries and canal give that variety which is the charm of the life of the naturalist. As is usual on this Society's excursions, the weather was ideal, and the sixty members present were in every way satisfied. A pleasing feature was the number of local teachers, members of the East Riding Nature Study Association.



Photo by]

The Market Weighton Canal.

[S. H. Smith.

The geologists, under the leadership of Mr. J. W. Stather, examined the Goodmanham Valley, which, besides many fine physiographical features, contained sections in the Lias, Red and White Chalk, and Gravel. In the Chalk some important zonal fossils were recorded, including large specimens of *Terebratulina gracilis*. This party also paid a visit to the church at Goodmanham, on the site of which, according to Bede, the great pagan temple was destroyed by its converted priest.

The botanists were under the care of Messrs. W. Robinson, J. J. Marshall and W. Ingham. They were able to report that the moss *Dicranum undulatum* still grew in its only known station for the whole of the British Isles. Fungi were not very common, but the ordinary Morel was found, as well as *Mitrophera semilibera*. In addition, *Pluteus cervinus* and *Hypholoma fascicularis* were obtained by Mr. A. E. Peck.

The conchologists were in full force, and were under the leadership of Messrs. Taylor, Musham, Roebuck and Hutton, but they were not successful in finding *Acanthinula aculeata*.

Mr. S. H. Smith favours us with a lengthy report of the birds observed. In this he records that the nest of a missel thrush with three eggs was found in a willow tree fork, only two feet above the ground.

ARACHNIDA. — Mr. T. Stainforth writes that the following spiders, which have been identified by Mr. W. Falconer, were obtained on the route taken by the botanists, entomologists, etc. :—

*Drassus lapidosus* Walck.  
*Clubiona reclusa* Camb.  
 „ *trivialis* L. Koch.  
 „ *comta* C. L. Koch.  
*Dictyna arundinacea* Linn.  
 „ *uncinata* Westr.  
*Amaurobius fenestralis* Stroem.  
*Theridion sisyprium* Clerck.  
*Bathypantes gracilis* Bl.  
*Gongylidium rufipes* Sund.  
 „ *dentatum* Wid..  
*Enidia bituberculata* Wid.  
*Diplocephalus permixtus* Camb.  
 \**Cnephlocotes obscurus* Bl.

\**Videria cucullata* C. L. Koch.  
*Cornicularia unicornis* Camb.  
*Pachygnatha degeerii* Sund.  
 „ *clerkii* Sund.  
*Meta segmentata* Clerck.  
*Epeira diademata* Clerck.  
*Oxyptila trux* Bl.  
*Pirata piraticus* Clerck.  
*Tarentula pulverulenta* Clerck.  
*Lycosa amentata* Clerck.  
 „ *pullata* Clerck.  
 „ *lugubris* Walck.  
*Epiblemmum scenicum* Clerck  
 \**Hasarius falcatus* Bl.

and the Harvestmen, *Platybunus triangularis* Herbst., and *Nemastoma lugubre* O. F. Muller. Species marked with an asterisk are additions to the East Riding List published in the 'Transactions of the Hull Scientific and Field Naturalists' Club,' Vol. IV., Part 2, 1909, pp. 87-102.

COLEOPTERA.—Mr. Stainforth writes that the following species have been identified among those taken on the excursion :—

*Notiophilus biguttatus* Fab.  
 „ *palustris* Duft.  
*Nebria brevicollis* F.  
*Elaphrus riparius* L.  
*Pterostichus madidus* F.  
 „ *vulgaris* L.  
*Amara ovata* F.  
*Anchomenus dorsalis* Müll.

*Bembidium lampros* Herbst.  
*Dromius quadrinotatus* Panz.  
*Haliphus ruficollis* De G.  
*Laccophilus obscurus* Panz.  
*Hyphydrus ovatus* L.  
 \**Philhydrus coarctatus* Gredl.  
*Creophilus maxillosus* L.  
*Philonthus æneus* Rossi.

*Philonthus marginatus*. F.  
*Stenus junco* F.  
 „ *bupthalmus* Crav.  
*Necrophorus humator* Goez.  
*Silpha opaca* L.  
 \* „ *thoracica* L.

*Silpha rugosa* L.  
*Hister unicolor* L.  
*Aphodius luridus* F.  
*Chrysomela staphylea* L.  
*Melasma populi* L.  
*Prasocuris junci* Brahm.

The most interesting of these are *Silpha thoracica*, one specimen of which was taken by Mr. E. Sawyer, and *Philhydrus coarctatus*, both additional records for the East Riding. *Melasma populi* was very abundant. T. S

## FIELD NOTES.

### BIRDS.

**Cream-coloured Snipe at Horncastle.**—In the middle of January last, Mr. A. Hill, of Horncastle, shot, in a grass field, within 200 yards of the Horncastle Market Place, a cream-coloured Snipe, which was afterwards stuffed for Neville Lucas Calcraft, Esq., J. P., of Gautby.—J. CONWAY WALTER, Horncastle.

**Tragic Death of a Linnet.**—Birds frequently meet with



an untimely end through becoming entangled in their nesting materials. In the March number of 'The Naturalist,' I recorded the death of a Swift by strangulation; early this month a friend of mine noticed a Linnet flying about a patch of gorse with a lump of wool attached to its leg. A week later he was searching the same gorse when he came across the same bird, but unfortunately the wool had become entangled with the twigs near the nest, and the bird was hung head downwards quite dead. As in the case of the Swift, the bird in its struggles had turned continually in one direction, and the wool, as will be noticed in the photograph, is very tight and hard at the beginning

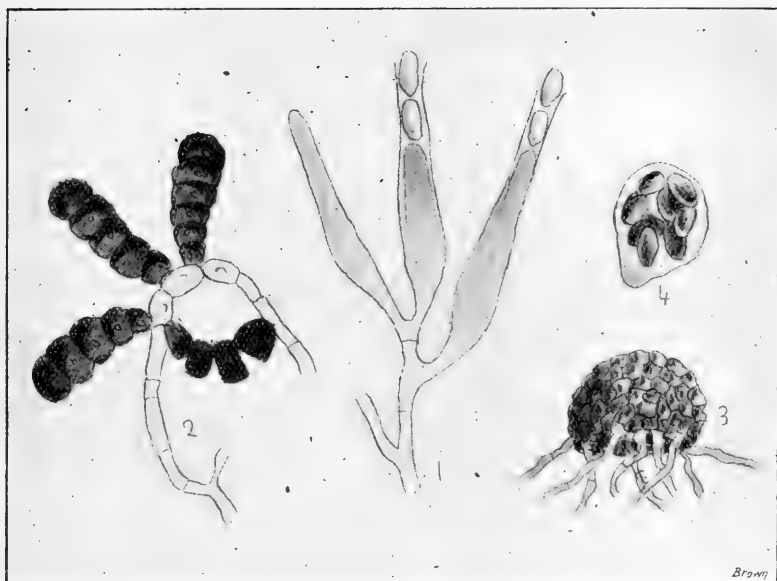
Photo by [R. Fortune, F.Z.S.]

of the twist.—R. FORTUNE.

## POLYMORPHISM IN FUNGI.\*

G. MASSEE, V.M.H., ETC.,  
Kew.

NOWHERE else in the Vegetable Kingdom do we meet with such sharply differentiated stages, collectively constituting an individual, as are to be met with in some groups of Fungi. Such stages of an individual are, in many instances, so markedly dissimilar in general appearance, structure, and mode of life, that in past times they were respectively looked upon as entities or species, containing an individuality of their own, and were considered as constituting distinct genera belonging



*Thielavia basicola* Zopf.—1, first conidial (*Milowia*) stage; 2, second conidial (*Torula*) stage; 3, Peritheciium or fruit of the highest or ascigerous stage; 4, ascus containing eight spores, produced in the peritheciium. Figs. 1, 2 and 4, mag. 400 times; Fig. 3, mag. 50 times.

to widely separated families. Numerous fungi consist of two or three such stages in their complete life-cycle, others have half-a-dozen or more.

\* Address delivered at the Annual Fungus Foray, held at Sandsend. See 'Naturalist,' Jan. 1909, pp. 21-29.

In many instances these different stages all grow on the same substance and at the same spot, following each other in the proper sequence. In numerous other instances, as in the rusts and mildews of cereals and other plants, different stages of the fungi grow on totally different kinds of plants, the spores or reproductive bodies of one stage being usually conveyed by wind from one host-plant to another. In other instances, insects are the agents that convey the spores produced by one stage to the place where infection is necessary to produce the following stage. This occurs, for example, in a fungus called *Sclerotinia heteroica*, one stage of which grows on the young leaves of *Vaccinium uliginosum*. The spores produced by this form of the fungus are unconsciously conveyed by insects, and deposited on the stigmas of *Ledum palustre*. It may be necessary to explain this transportation of spores on the part of insects, which is entirely due to the fact that insects, in common with other living organisms, must eat to live. The form of the fungus growing on *Vaccinium* leaves, which resembles a minute white mould, secretes a sweet, scented substance, approved of by certain small insects as food. While partaking of this food, the proboscis of the insect becomes dusted with the spores of the fungus. The flowers of *Ledum palustre* also contain something that can be utilised by the same insect, and is accordingly visited in turn. In the act of obtaining the nectar, the spores adhering to the proboscis of the insect are deposited on the stigma of the *Ledum* flower. This appears to be entirely a matter of chance, but the chance obviously happens sufficiently often to secure the continuance in fair abundance of the fungus under consideration. The spores deposited on the stigma of *Ledum* germinate quickly, grow down the style, and enter the ovary, where a dense mass of mycelium or spawn is formed. This spawn remains in a resting condition until the following spring, when it gives origin to spore-bearing bodies resembling miniature champagne glasses, supported on long stalks. The spores from these structures are dispersed by wind, and those that happen to alight on the young leaves of *Vaccinium* set up infection, which results in the production of the first mould-like condition of the fungus. What at first sight might be considered as a series of coincidences connected with the life-history of the fungus briefly detailed above, must be considered as part of the scheme of evolution and struggle for existence on the part of the fungus. Both its host-plants suffer from

its attack. The *Vaccinium* has certain of its leaves more or less injured, and the *Ledum* that becomes infected loses many of its seeds without any obvious compensation. On the other hand, the fungus has so arranged the sequence and period of spore formation, that the spores borne on the *Vaccinium* host are just mature when the *Ledum* is in bloom, whereas the production of spores in the phase of the fungus parasitic on *Ledum*, are delayed until the following spring, when young *Vaccinium* leaves are present in abundance. When different stages in the life-cycle of a fungus grow on different host-plants, the term heterœcism is applied.

Now heterœcism, the most brilliant botanical discovery of the nineteenth century, made by de Bary, had its origin in what was considered as a farmer's superstition. The well-known rust of wheat—*Puccinia graminis*, had from time immemorial, been considered by farmers as in some way dependent on a fungus occurring on barberry bushes. De Bary, a celebrated German mycologist, determined to test this popular idea, and inoculated wheat plants with spores obtained from the fungus growing on the leaves of a barberry bush, and was surprised to find the well-known rust of wheat appear in due course at the points infected. Repeated experiments proved that the rust of wheat and the "cluster-cups" on barberry were stages of one and the same fungus. This discovery has led to the reduction of numerous forms, at one time considered as good species, to the condition of stages in the life-history of other species.

THIELAVIA BASICOLA.—A Yorkshire fungus, although not an example of heterœcism, includes three markedly different stages in its complete life-cycle. In fact, the three stages are structurally so distinct that they were originally placed in three different genera, which belonged respectively to three different families of the Fungi. More than half a century ago, Berkeley discovered a fungus forming black stains on the root and lower part of the stem of garden peas, and a cultivated species of *Nemophila*. To this fungus, which proved, from the standpoint of knowledge at the time, to be an undescribed species, Berkeley gave the name of *Torula basicola* (Fig. 2).

About twenty-five years ago I found a small, snow-white mould-like fungus on the base of the stem, and on the dead leaves of *Blysmus compressus* in the neighbourhood of Scarborough. This was considered as a new genus, and was called

*Milowia nivea*. *Milowia* was considered by Professor Saccardo as possessing such distinct characters, that he established a new tribe of the Hyphomycetes called *Milowieæ*, with the genus *Milowia* as the type. At a still later date, Zopf, a German botanist, discovered a black ascigerous fungus parasitic on the roots of a species of *Senecio* in Germany. This fungus proved to be new, and received the generic name of *Thielavia* (Figs. 3 and 4). Zopf observed that the fungus called *Torula basicola* was growing along with his new fungus *Thielavia*, and on cultivating the *Torula*, he found that it gave origin to the *Thielavia*, hence Zopf proved that the *Torula* was a conidial condition of his new genus *Thielavia*, which he accordingly named *Thielavia basicola*. Zopf also observed the presence of a white fungus accompanying the *Torula*, which from his description, tallied with my genus *Milowia*, but had no opportunity for growing this form. Subsequently I met with *Milowia*, and found that the spores of this form gave origin to the *Tornula* stage, the spores of which in turn, after a period of rest, produced the highest ascigerous condition of the fungus, *Thielavia basicola*.

All the three stages follow each other on the same host-plant. The two conidial forms, *Milowia* and *Torula* develop on the living plant, and are parasitic; whereas the highest ascigerous form only appears when the host-plant is dead and decayed, hence its tardy discovery.

*Thielavia*, in its *Torula* stage, was recently sent to Kew for determination from the neighbourhood of Doncaster, where it had destroyed a row of young peas. The fungus is recognised as a destructive parasite, on the roots of many different kinds of cultivated plants, both in Europe and in the United States.

---

A pleasant afternoon was spent on May 15th, when a representative gathering of Curators and others interested in Museums assembled at **Burnley**, on the invitation of the Chairman and Secretary of the Burnley Art Gallery and Museum Committee. The collections are housed in the historic Towneley Hall, which, together with its excellent grounds, was purchased by the Burnley Corporation many years ago. The fine hall is a museum in itself. One room illustrates Old Burnley, and there are a few geological and archaeological exhibits. Amongst the latter is a fine flint dagger, found at Burnley. It is of the rare type illustrated in this journal for July, 1908, p. 231. After tea, which was kindly provided in the Hall, various museum appliances, etc., were shewn, and papers were read on 'The Use of Illustrations in Museums,' by Mr. P. Entwistle (Liverpool) and 'Museum District Survey Work,' by Mr. S. L. Mosley (Keighley).



## REVIEWS AND BOOK NOTICES.

**The Genitalia of the Noctuidæ**, by **F. N. Pierce, F.E.S.** Liverpool : A. W. Duncan. Price 7/6.

It is not surprising that the volume before us has been awaited for some time with considerable interest by entomologists; for, although books for students of the Lepidoptera are legion, we have never before in Britain had one treating on the branch of the subject which Mr. Pierce has made practically his own. True, we had many years ago two papers in the 'Transactions of the Linnean Society' dealing with the genitalia of the Butterflies, by Mr. P. H. Gosse and Dr. F. Buchanan White respectively, and still later in the United States of America some attention has also been paid to the genitalia of the Noctuidæ. But Mr. Pierce can fairly claim that his book makes an innovation in the methods of study of this branch of entomology so far as the lepidoptera are concerned. In some other orders the great value of the genitalia in the determination and classification of species has long been appreciated, as instance the magnificent work on the European Trichoptera by the late R. McLachlan, F.R.S.. In that order, indeed, and in the more obscure groups of the Neuroptera, species are now determined almost entirely by the structure of the genitalia, as experience has proved that they are the only characters which are different in practically every species, and at the same time constant in themselves.

We do not suppose that the genitalia will ever become as useful in the determination or classification of the lepidoptera, because in the first place, the vast majority of the species are so obviously different from each other, even in marking, shape, wing and body characters, etc., that no possible doubt about their distinctness or place in the group can exist; and in the second place, the genitalia do not appear to be by any means so infallible a guide as in the other orders we have alluded to. For instance, Mr. Pierce tells us (p. 27), that he can see no difference in the form of the genitalia of *Leucania pallens* and *L. fawicolar*, except that the latter is larger. Then those of *Xylophasia polyodon*, *X. sublustris*, and *X. lithoxylea* he says (p. 41) 'are wonderfully alike.' More recently, Mr. Pierce's examination of the genitalia of the tortrices *Pædisca nevana* and *P. geminana* showed practically no difference. Yet the differences in other respects in all these are so evident that probably every lepidopterist who knows them in the field will continue to regard them as distinct species.

On the other hand, it is clear that we have for years been regarding as single species, some, which had the genitalia been examined, would long ago have been separated into two, and in one instance, into as many as four species! This case occurs in the moth which, under the name of *Hydræcia nictitans*, has been supposed to be abundant everywhere, and familiar to every collector. By the differences in the genitalia Mr. Pierce easily makes the four species, *nictitans*, *paludis*, *lucens* and *crinensis* out of it. It must in fairness be said here, however, that some twenty years ago, Mr. J. W. Tutt separated to his own satisfaction, from the habits, shape, and wing markings alone, *paludis* and *lucens* from *nictitans*, a verdict in which, at the time, but few lepidopterists were willing to follow him. Examination of the genitalia, too, has settled the specific differences between *Coremia ferrugata* and *C. unidentaria*, between *Nonagria arundineta* and *N. neurica*, and between *Retinia buolianana* and *R. pinicolana*, but of which few lepidopterists had previously any doubt. On the other hand, Mr. Pierce's method seems to have settled the specific identity of *Noctua conflua* with *N. festiva*, of *Agrotis aquilina* with *A. tritici*, and *Dianthæcia capsophila* with *D. carpophaga*.

The style of the book is attractive. In the Introduction, we have a concise but clear account of the manipulation required for an examination of the genitalia, followed by an explanation of the terms used in the descriptions—some of them entirely new to the lepidopterists' vocabulary—

and illustrated by a well-executed plate representing 'Typical Male Genitalia.' Then come the descriptions, clear and intelligible, of the genitalia of the various species, under the heading of 'Classification of the Noctuidæ based on the Structure of the Male Genitalia'; and followed lastly by 32 plates containing 350 figures of the genitalia of practically all the British species of Noctuidæ. These figures are really splendid, and have evidently been most carefully drawn from the specimens. Although highly magnified, every detail is so clear, that, together with the descriptions, it should be impossible to get wrong in the examination of specimens.

We congratulate Mr. Pierce most heartily on his book, which must take a high place among entomological literature.

G. T. P.

## NORTHERN NEWS.

Our contributor, Mr. J. J. Burton of Nunthorpe, has been elected a Fellow of the Geological Society of London.

Amongst the recently-elected Fellows of the Royal Society we notice the names of Dr. F. A. Bather, Mr. A. J. Jukes-Browne and Prof. W. J. Lewis.

We regret to record the death of Frederick Edward Hulme, whose works on familiar wild flowers have proved such a boon to young naturalists.

Sir Thomas Henry Holland, of the Indian Geological Survey, towards the end of the year will succeed Prof. W. Boyd Dawkins, as Professor of Geology at the Manchester University.

A grant of £10 has been voted by the Caradoc and Severn Valley Field Club to Mr. H. E. Forest, the amount to go towards the publication of 'The Vertebrate Fauna of North Wales.

A series of twelve examples of *Geotrupes typhæus* from Tatton Park, shewing the development of the horns in the male, has been given to the Warrington Museum by Mr. G. A. Dunlop.

A contemporary asks 'every friendly reader' to send notes. 'Do not think anything too trivial to send. If it interests you it will probably be of general interest, and in that case will be *worthy of publication!*' Probably this explains the reason for the recently increased price of that journal.

Evidently birds sing differently in different places. Under 'Birds of Note' in a natural history contemporary, we were surprised to find the Gull, Eagle, Nightjar and Peregrine. The same journal is starting a column in which to record 'some of the errors in natural history, which are constantly disseminated by the press' *Et tu, Bruté!*

A Nature Study Exhibition organised by the Nature Study Society, will be held at the Royal Botanic Gardens, Regent's Park, N.W., on Friday and Saturday, June 4th and 5th. It will be open each day from 10 a.m. to sundown. It will include Aquaria, Vivaria, and other means of observing animals, with photographs and microscopical illustrations. From the report of the previous Exhibition organised by this Society, which has been sent to us, there is every probability of the forthcoming one being very successful.

At the recent Annual Meeting of the Leeds Philosophical and Literary Society it was announced that there had been a slight falling off in the attendances at the museum during the year. Notwithstanding the fact that the fees paid for lectures was £68, as compared with £123 for the previous session, there was still a loss on the year's work of £8. The question as to the future of the Society's museum was raised, and apparently it is not yet decided whether it shall be taken over by the Corporation, or go to the University. One of the most valuable acquisitions during the year was the skeleton of a woman found in the Scoska Cave, Littondale.

# THE NATURALIST.

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T. SHEPPARD, F.G.S., The Museums, Hull.

## NOTES AND COMMENTS.

MEMORIES : FRANCIS GALTON.\*

In his charmingly-written autobiography, Dr. Francis Galton gives many interesting glimpses into an exceedingly interesting career; and in addition, we have reminiscences of several leading men of science who have now passed away; men who were fellow-workers with Galton, but who are known to the present generation by their works alone. In many respects the life of Dr. Francis Galton reminds us of the career of our late grand Yorkshireman, Dr. Sorby; would that he, too, had left us a volume of 'Memories'! Neither Sorby nor Galton had that 'struggle for existence' which is the fate of so many scientific men, and both were thus able to devote their lives in the pursuit of science, with such excellent result.

### CROTON OIL.

It is impossible in a short notice to even refer to the numerous interesting chapters dealing with travel, heredity, anthropometric research, etc., for which Dr. Galton is so well known. The book must be read to be appreciated. It is full of interesting anecdote; so much so that the present writer simply *had* to read the volume through, although work on all hands was pressing. As a sample of Dr. Galton's methods, it is worth noting that when quite a young man, engaged in medical work, he endeavoured to get a practical acquaintance of medicines by taking small doses of all that were included in the pharmacopœia, commencing at the letter 'A.' He nearly reached the end of 'C,' when he came to Croton Oil, and 'foolishly believed that two drops of it could have no notable effects as a purgative and emetic'! Apparently he took the rest of the pharmacopœia as read!

### A BOOT STORY.

As illustrating the fact that different persons feel pain with different degrees of acuteness, reference is made to a native of New Zealand, where it was once the height of fashion for the Maories to wear boots 'on great occasions.' 'A youth had saved money, and went to a store a long way off, where he had purchased a pair of these precious articles. On returning home he tried to put them on, but one of his feet had a long projecting toe, which prevented it from being thrust home. He

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\* 'Memories of My Life,' by Francis Galton, F.R.S., etc. Methuen & Co., London. 339 pp. 10/6 net.

1909 July 1.

went, quite as a matter of course, to fetch a bill-hook which was at hand, and, putting his foot on a log of wood, chopped off the end of his long toe, and drew on the boot ! ’

#### A SEAL STORY.

In the Shetlands young seals are sometimes kept as pets. One of these came to the house of a fisherman for company, for warmth, and for food. Eventually it grew, was too big for a pet, and was troublesome to the children. ‘ The fisherman, sad at heart, took it with him in his boat, far away to the fishing-ground, and threw it overboard. Some days later, when the family were at supper, rather dismal at the loss of their old friend, they heard the familiar sound of scuffling and scratching, and on opening the door, in flopped the seal ! ’

#### AN IMPRESSION.

Whilst photographing lunatics, one of them, who thought himself to be Alexander the Great, was annoyed at not being photographed the first. ‘ When the photographer had his head well under the velvet cloth, with his body bent in the familiar attitude of photographers, whilst focusing, Alexander the Great slid swiftly to his rear, and administered a really good bite to the unprotected hinder end of the poor photographer, whose scared face emerging from under the velvet cloth rises vividly in my memory as I write this. The photographer guarded his rear afterwards by posting himself in a corner of the room.’ There are many other ‘ impressions ’ in these ‘ Memories ’ !

#### THE DARWIN CELEBRATIONS AT ‘CAMBRIDGE.

At the Darwin celebrations at Cambridge on June 22nd, each delegate from the Universities and learned societies was presented with a most useful and appropriate memento of the occasion. This took the form of ‘ The Foundations of the Origin of Species,’ a sketch written in 1842 by Charles Darwin, and edited by his son, Francis Darwin. This most valuable document accidentally came to light when the house at Down was vacated on Mrs. Darwin’s death. Mr. Francis Darwin tells us that when he was at work upon ‘ *Life and Letters*,’ he had not seen it. ‘ The MS. was hidden in a cupboard under the stairs, which was not used for papers of any value, but rather as an overflow for matter which he did not wish to destroy.’ This historic document has been printed by the Syndics of the University Press, and, together with the Editor’s intro-

duction, forms a valuable memento of a memorable event. In addition, the same publishing house has issued the 'Order of Proceedings at the Darwin Celebrations,' with a sketch of Darwin's life. It is illustrated by a number of most interesting photographs, and can be obtained at half-a-crown.

#### THE BOULDERS OF THE CAMBRIDGE DRIFT.

Some interesting notes on the ice-borne erratics of the Cambridge drift were recently read to the Geological Society of London, by Messrs. R. H. Rastall and J. Romanes. For several years past large numbers of boulders have been collected from the glacial drifts of Cambridgeshire, and from the post-glacial gravels which have been derived from the drifts. These specimens have been classified geographically and then subjected to a careful petrological examination, with a view to the determination of their origin. Some special collections from Hitchin and Bedford have also been included for comparison. Rocks of Scandinavian origin, and especially those of the Christiania province, are abundant throughout the whole area: such well-known types as rhomb-porphry and nordmarkite are common. Rocks from the Cheviots and Central Scotland are more abundant than was formerly believed, and specimens have also been identified from the old red sandstone conglomerates of Forfarshire and from Buchan Ness (Aberdeenshire). Lake-District rocks probably also occur in small quantity. Much of the chalk and flints appears to be of northern origin.

#### BOULDER CLAYS.

It is concluded that an older boulder-clay, containing foreign erratics, the equivalent of the Cromer Till, once extended over the whole district, but was subsequently incorporated with the great chalky boulder-clay. The Scandinavian ice advanced from the direction of the Wash, bringing with it red chalk and bored *Gryphæas* from the bed of the North Sea, and carrying them as far west as Bedford. Rocks from the north of the British Isles become progressively scarcer from west to east, and the distinctive types are absent to the east of Cambridge. They appear to have been brought by an ice-stream coming from a northerly direction, which probably to a certain extent, replaced the Scandinavian ice towards the east.

## In Memoriam.

THOMAS MELLARD READE, F.G.S.

WE regret to record the death of one of our oldest contributors, Thomas Mellard Reade, which recently took place at his residence, Blundellsands, Liverpool, at the age of seventy-seven. Mr. Reade was a civil engineer, and in connection with his work in the Liverpool district, he had many opportunities of studying the more recent geological strata. He was a voluminous writer, there being about two hundred papers to his credit, mostly dealing with glacial and post-glacial deposits. He was one of the leading supporters of the old idea of the marine origin of Boulder clay; probably he was one of the last to actively support that theory.

His most important treatise appeared in 1886 on 'The Origin of Mountain Ranges considered Experimentally, Structurally, Dynamically, and in Relation to their Geological History.' This was followed in 1903 by 'The Evolution of Earth Structure with a Theory of Geomorphic Changes.' He became a Fellow of the Geological Society in 1872, and was awarded its Murchison medal in 1896. He took an active interest in the Liverpool Geological Society, occupying its Presidential chair on three occasions.

T. S.

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**A Survey and Record of Woolwich and West Kent.** Woolwich, 1909. 526 pp.

This volume recalls the excellent handbook compiled in connection with the British Association at Glasgow a few years ago. It contains an account of the geology, botany, zoology, archaeology, etc., of the Woolwich area; the major portion being devoted to carefully-compiled lists of species of animals and plants. The original intention was that the handbook should be prepared for the twelfth annual Congress of the South-Eastern Union of Scientific Societies, held at Woolwich in 1907. Some sample pages only were ready by that time, however; and now, nearly two years after the Congress, the handbook is ready. The delay, it seems, could not be helped, and undoubtedly the volume is much more comprehensive and complete than it would have been. The general editors are Messrs. C. H. Grinling, T. A. Ingham and the late B. C. Polkinghorne, and amongst the many contributors we notice such well-known names as W. Whitaker, A. E. Salter and J. W. Tutt. The book does not profess to be complete, and the editors ask for particulars of omissions from this 'preliminary edition.' We would like to draw attention to the omission of the 'survey of surveys, and a sketch of work waiting to be done,' said to appear in a 'final chapter.' There is a long list of errata, but it is not complete. The second word 'Additions' should be 'Remarks' on the heads of pp. 457-9, and 461. The indexes are particularly complete and useful, and, on the whole, the book is a valuable record.



## THE PRESENT STATE OF OUR KNOWLEDGE OF CARBONIFEROUS GEOLOGY.

DR. WHEELTON HIND, F.R.C.S., F.G.S.

(Continued from page 231).

The fauna obtained at Hagen contains a number of late Viséan forms of Brachiopods, which are known to range through out the Pendleside Series in England (Congleton Edge), with *Goniatites* which are generally associated with *Posidonomya becheri* in Devonshire.

*Glyphioceras striatum.*  
,, *sphaericum.*

*Glyphioceras crenistria.*  
*Orthoceras morrisianum.*

The Culm of Magdeburg has been described by D. W. Wolterstorff.\* The figures of his *Goniatites* and lamellibranchs shew that his fossils are identical with those of the Herborn beds. I also suspect that he may have remains of a higher zone. The fossils he figures as *Dimorphoceras Törnquisti* have a strong resemblance to *Glyphioceras bilingue*, and I take the large *Goniatite* (Fig. 11), to be either *G. Phillipsi* or a large form of *G. reticulatum*. The greater part of the fauna, however, indicates the Herborn beds, probably just above the horizon of *Posidonomya becheri*, which always appears in England to have a very limited vertical distribution in the Pendleside Series.

It would, therefore, seem that the presence and persistence of the Pendleside fauna over Western Europe, and the fact that its zone fossils always succeed each other in proper sequence affords most certain and definite evidence of the correlation of the Pendleside Series and the Culm of Devonshire with the Namurien of Belgium and the Culm of Germany, but the view in Germany is that the Culm beds are of Tournaisian age, and therefore below the Viséan. Certain stratigraphical facts, with which I will now deal, are advanced in support of this view.

In 1904 Dr. Parkinson published a paper on 'The Zoning of the Culm in South Germany,'† in which he definitely makes out the Culm to be below the horizon of the Viséan.

The facts which I was shewn in the field are as follows:—In the neighbourhood of Königsberg, north of Giessen, are

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\* 'Das unter Carbon von Magdeburg Neustadt und seine fauna.'

† 'Geol. Mag.', Dec. 5, Vol. I., p. 272-276.

outcrops of a slaty breccia with some limestone, which yield the following fauna :—

<i>Productus giganteus.</i>		<i>Productus punctatus.</i>
„ <i>semireticulatus.</i>		<i>Spirifer cf. bisulcatus.</i>
<i>Orthotetes crenistria.</i>		<i>Chonetes papyracea.</i>

CORALS AND TRILOBITES.

<i>Cyathophyllum.</i>		<i>Cyclophyllum.</i>
<i>Cyathaxonia.</i>		

*i.e.*, a fauna of a type high up in the Viséan, totally different from any of the known Culm faunas of Germany, and in this I am in agreement with Dr. Parkinson. The stratigraphical relation of the Königsberg fauna to any of the Culm faunas is utterly unknown, no section exists which shews any connection between them. The Königsberg beds are underlaid by a Grit (grauwacke), and the Herborn beds are, on the other hand, immediately succeeded by a grauwacke, but there is not any evidence definite enough to shew that the grauwacke is the same or on a different horizon. Other outcrops of similar slaty breccias have been found in the neighbourhood of Battenberg with organic remains in a fragmentary condition, which I see no reason to think are other than on the horizon of the Königsberg beds. Now the whole district is much disturbed and overthrusts are many, and the Königsberg beds themselves are much contorted and broken, so that little inference can be drawn from small isolated sections. Stratigraphical evidence being wanting, the key to this problem must be sought elsewhere where the faunal succession is well known. It is true that in the neighbourhood of Königsberg, 400 yards east of village, we find a succession from above downwards of *Posidonomya* beds, Chert, Diabase, Upper Devonian, and that when these beds are cut off by a fault, a section shews a grauwacke, on which lies a slaty breccia with limestone containing the Viséan fauna.

The Culm fauna has never yet been found to occur elsewhere below a true Viséan fauna. It is a definite, distinctive, and characteristic fauna, unknown at any Carboniferous horizon except immediately succeeding the Viséan or Upper *Dibunophyllum* zone.

It is most interesting to know that there are traces of a Viséan fauna in South Germany, which have been preserved amid the upheavals and shatterings that the rocks have undergone since deposition, and that contemporary volcanic action,

though interfering largely with the deposition of Viséan rocks, did not wholly prevent the establishment of a Viséan fauna in that area.

It is argued that the latter series cannot be below the *Posidonomya* Cherts, because there is not room for them between the Devonian Diabase and the cherts, but it is forgotten that the lowest Culm fauna, *i.e.*, the Erdbach Breitscheid or *Prolecanites compressus* fauna, which is admitted to be below the *Posidonomya* beds, is absent, and that consequently the lowest member of the sequence is absent at Königsberg.

Now the Viséan fauna of Königsberg is that which is always found to immediately precede the *Prolecanites compressus* beds, and would only be a few feet below it, and I should expect to find indications of both faunas in the same locality. The question is one therefore that could only be settled by an appeal to palæontology in such a disturbed area, especially when volcanic activity played a large part in conditioning the deposition of the series.

Two points are of interest, *i.e.*, first, the question of the relation of the Upper Devonian beds to the Culm is identical for Devonshire and Germany, and I think that the key to this question will be found in Belgium; second, that the closing of *Dibunophyllum* times, and the ushering in of the Pendleside type was accomplished in Great Britain with much volcanic interference both in the Midlands and South Devonshire.

### THE MILLSTONE GRIT.

The Millstone Grit requires very careful study at the present time. The series, when present in force, is very easily recognised, and offers fine features with its weathered crags, and its shale valleys and cloughs. But the unfortunate character of the whole series is its extremely local development. It is known that in Belgium its representative, the Grès grossier of Andenne, is only 12 metres thick; that in the West of Ireland the series is about 300 feet, and in Scotland 687 feet, mostly shales; while in Lancashire the whole series is very rapidly expanded into more than 3000 feet. The local variation in thickness of the series is well seen in North Staffordshire, where the Grits on the Cheshire border at Mottram are 2700 feet thick, but in the course of 20 miles south, the whole series is only represented by 300 feet of Grits and Shales.

North of Settle, where no representatives of the Pendleside

faunas have been found above the *Dibunophyllum* zone of the Limestone, the Grits succeed immediately the Yoredale Series with a *Productus giganteus* fauna, and this is the case in Northumberland also, but in Scotland, as I have mentioned above, a peculiar fauna with *Prothyris elegans*, hitherto known only from the Coal Measures of Nebraska, U.S.A., is typical of the beds which intervene between the Upper *Dibunophyllum* beds and the Coal Measures. The Grits are the detritus of a granite country, which local distribution seems to indicate as having occupied a position to the North-East.

Many fossil horizons are known in the shales, which separate the different beds of Grit from each other. I published all the information I then had on the subject in 'The Naturalist,' 1907, pp. 17-23 and 90-99, and unfortunately I have nothing fresh to add. The Grits themselves contain plant remains, and they, however, furnish the following very important piece of evidence. The flora of the Millstone Grit is allied to the Upper or Coal Measure flora in distinction to the flora of the Pendleside Series and Carboniferous Limestone Series, which is characterised by a lower Carboniferous flora. The flora is therefore the index to the Series, and no beds should be assigned to the Millstone Grit, which are characterised by the lower flora, nor can we be always certain in the absence of the flora, whether any Grit is the representative of Millstone Grit or earlier beds; for example, the so-called Millstone Grit of Bristol probably represents in time a part of the Pendleside Series.

The Millstone Grit Series of England appears to have no fauna of its own. In the neighbourhood of Halifax we find the persistence of a late Pendleside fauna as high as the third Grit, and in the neighbourhood of Harrogate is a Calcareous Grit, the Cayton Gill beds, in which a late *Dibunophyllum* fauna seems to have reappeared.

In the Carboniferous succession of Denbighshire, the Millstone Grit is probably only represented by 100 feet of beds, including the Aqueduct Grit.

It is difficult to conceive the exact conditions under which a deposit, averaging from 500-100 feet over an extensive area, suddenly becomes enormously thick over a limited district to between 2000 and 3000 feet. Whatever it was, the cause is intimately connected with the origin of the Pendleside Series, itself a very local deposit, for the greatest thickness of the Mill-

stone Grit coincides with the greatest thickness of the Pendle-side Series.

### COAL MEASURES.

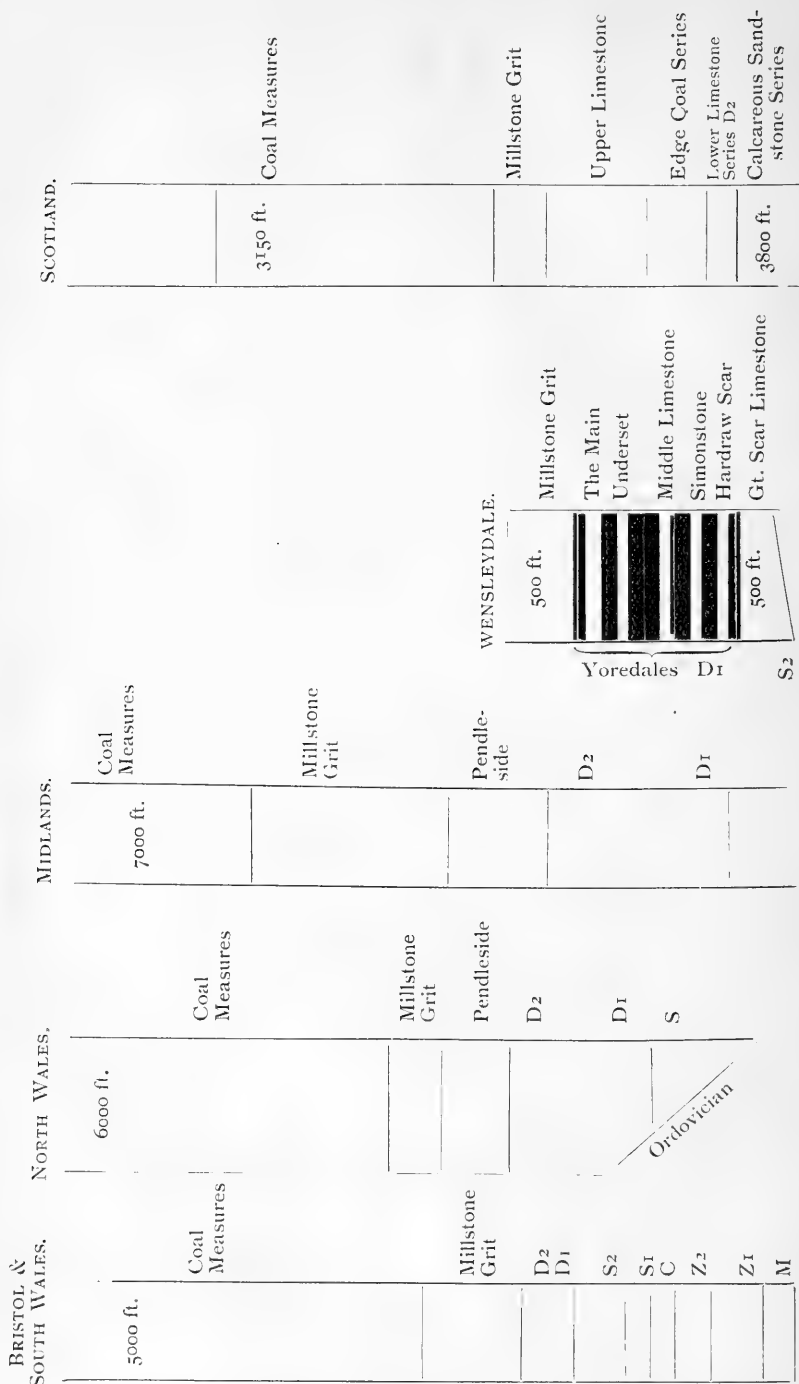
It would be a very lengthy task to enumerate all that is known of the Palæontology and Palæobotany of the various Coalfields in Great Britain and Ireland. I would claim that much more than a foundation has been laid for the accurate determination of the various life zones in the Coal Measures. In the first place the study of the distribution of plants demonstrates that it is perfectly easy to determine broadly certain main sub-divisions which are identical with the Coalfields of Western Europe, so that it may be affirmed that the flora indicates three or four phases in the 6000-7000 feet of Coal Measures.

The North Staffordshire Coalfield has been studied by local observers for many years, from a palæontological point of view, and I claim that the distribution of the fresh water Mollusca, and in a secondary way the relations of beds containing these zonal forms with intercalated marine bands, renders it possible to determine at least 16 distinct fossil horizons. The marine bands are useless by themselves, for the fauna of the various marine bands resemble each other very closely. But the series being sub-divided into the zones of *Anthracomya calcifera*, *A. phillipsi*, *A. wardi*, *A. adamsi*, *A. williamsoni*, *Carbonicola robusta*, a definite marine band occurring above or below one or other of them gives valuable information as to other horizons,

I claim as far as the North Staffordshire Coalfield is concerned that the Coal Measures have been definitely zoned, and am glad to know that work on similar lines in other Coalfields is revealing a practically identical palæontological sequence to that which is found to obtain in North Staffordshire.

I think that it can now be claimed that we know fairly well the local variations of the Carboniferous succession, as expressed in Western Europe, and that in our own country each province of the Carboniferous Series has been zoned by its fossils. The main question now outstanding is the comparison of the different types of deposit in each area. The idea of broad and far-reaching unconformities no doubt will account for much, and these will doubtless be made out with greater ease once the life zones are well and accurately known.

The science of Palæontology is biological, and not mathematical, and we know that many factors came into play which



militate against the employment of biological phenomena as absolute indices of physical conditions. The question may always be raised, when it is found that a species or fauna becomes extinct about a certain horizon, did the species or fauna become extinct really or locally? Did it migrate to some locality, and flourish long after it had ceased to exist at its original locality? In conclusion, in working out life zones of a series of rocks, the following facts may be useful as aphorisms. In a succession of strata, where muddy conditions succeeded a pure limestone phase, it is natural to expect a change of fauna, but where two shales or limestone contain dissimilar faunas, they are probably not contemporaneous. Faunas of different bathymetric zones may be contemporaneous, though they are dissimilar.

The period of time during which a species or fauna may survive at any locality depends entirely on the conditions of environment. Hence conditions will determine the vertical extent of rocks characterised by a zonal group or species.

Dissimilar faunas may be contemporaneous. To take an example, the fresh water and marine fauna of the Coal Measures must have been in existence contemporaneously in different areas, though they never occur in the same bed.

Hence it is rarely safe to rely on single species, and the larger the group used to denote a zone, the more accurate will be the result. It is the association of a number of species at a horizon which I consider to be the important thing in zoning the Carboniferous rocks. And the first appearance of such an association of forms is obviously the most important horizon, as it points to the establishment of a new set of conditions.

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**A Naturalist in Tasmania**, by **Geoffrey Smith**. Oxford: Clarendon Press. 151 pp., 7/6 net.

With the aid of a substantial grant from the British Association, Mr. Smith paid a six months' visit to Tasmania, principally to study the fresh-water life of the island, and particularly that strange creature, the Mountain Shrimp, which seems to be a survival from Carboniferous times. During his sojourn on the island, the author made many interesting notes in reference to the fauna, flora, history and anthropology of Tasmania, which are now presented in the form of a very interesting narrative. To the student of geographical distribution the volume is essential. There are evidences of parts of the book having been hurriedly, if not carelessly written. On page 60 the word 'cushion' appears half a dozen times quite close together, and other words are unnecessarily repeated. We made a hasty reference to the page said to contain a drawing of 'the Devil by Mr. Goodchild,' only to find *Sarcophilus ursinus*, with neither hoof, horn, nor forked tail.

## THE BROAD-LEAVED WOOD GARLIC OR RAMSONS.

(*Allium ursinum*).

JAS. E. McDONALD.  
Stockport.

(Continued from page 202).

Each plant is always capable of furnishing sufficient of these roots to gain the desired effect. Adult bulbs of wood garlic have from five to six of these roots, their length averaging five or six inches, but may be as long as nine or ten inches. In addition to root hairs, three to six rootlets are given off almost at right angles from the blunt tips of the contractile roots, and form an even more effective anchorage (see fig. 10).

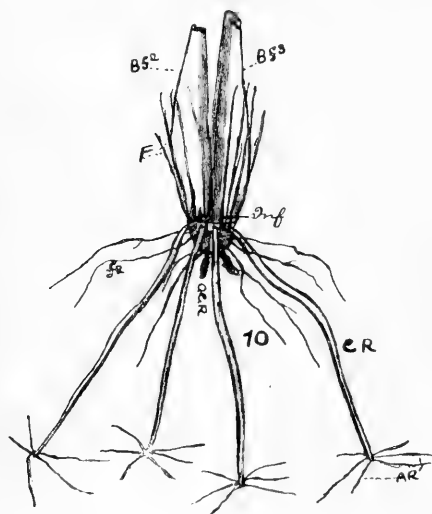


Fig. 10.—Double (twin) bulb, (partly diagrammatic), the result of development of a bulb similar to fig. 6; F, rigid fibres from previous bulb; INF, inflorescence scar; BF², and BF³, bases of leaves F² and F³ in figs. 6 and 7; CR, new contractile roots; AR, anchor rootlets; OCR, old contractile roots; FR, old fine roots.

From each adult bulb two or three foliage-leaves arise, and to be protected from injury by abrasion in their passage through the soil, they are covered by a closely sheathing scale-leaf until they reach the surface. At whatever reasonable depth the bulb is buried, this sheathing scale-leaf is capable of reaching the surface, when, having performed its function, it ceases to grow and quickly decays. Each scale leaf has a stiff

pointed apex; the whole scale, with the enclosed leaves giving rigidity, forms a very efficient boring organ. Even from a seedling, that was buried deeper than usual, a scale leaf was found  $1\frac{3}{4}$  inches in length.

The best season to notice the peculiarities of these scale leaves is during winter and early spring—say from November to March. When the surface has been reached, the leaves emerge from the sheath, and their petioles twist to reverse the



position of the blade, as already described. From this time till about the end of June, they manufacture food stuffs to store in their bases. The flowers open in May and June, and by then the old bulbs have decayed, and the new ones are rapidly forming. The leaves die in July, the peduncle remaining a little while longer to allow the seeds to ripen. When the seeds have ripened and been shed the peduncle decays, and nothing of the plant is then to be seen above ground for the period of rest—four to six months.

A good mature bulb will measure from  $2\frac{1}{4}$  to  $2\frac{1}{2}$  inches in length, and be about  $\frac{3}{4}$  of an inch in its broadest diameter, though the average is rather below this. A section will shew that one side is somewhat concave, and the other convex, but often with a groove running down the convex side. If examined during the resting period, they will be found somewhat as follows:—From their bases a ring of thick contractile roots grow obliquely downwards. Where these join the abbreviated stem several scars occur, one being that of the protective scale leaf of last season, the next below, that of the old bulb—from this scar a ring of rough fibres encircle the new bulb; the uppermost circular scar is that of the outer foliage leaf of last season, and within this, on one side of the bulb, is the triangular scar of last season's peduncle; and lastly, the new bulb itself. Near the tip of the bulb to one side is a U-shaped slit, which represents the summit of the sheathing portion of the innermost foliage leaf of last season. Every leaf is sheathing at its base, hence the circular leaf scars. The bud lies at the base inside. After growing up the tube, the new leaves and inflorescence emerge through the slit to continue their passage upwards through the soil.

In addition to multiplying by seed, there is a steady annual vegetative increase. An adult bulb often gives rise to two new ones. When this has been the case the scar of the previous inflorescence will be seen between them. These multiplying bulbs have three foliage leaves, as will be clear from the diagrams (figs. 6, 7, 10, 11). The outer of these foliage leaves ( $F^1$ ) encloses the inflorescence, and another leaf ( $F^2$ )—at least while young, the other leaf ( $F^3$ ) is not enclosed by ( $F^1$ ). The bases of leaves  $F^2$  and  $F^3$  form the two new bulbs (twin bulb). against possible gnawing enemies. To my mind, they are encircling one of the new bulbs, and the inflorescence (scape) scar, but not the other bulb.

A little consideration will make it clear that the inflores-

cence is terminal, and that leaf  $F^2$ , and therefore its bulbous base is really the first leaf of a bud in the axil of leaf  $F^1$ . The

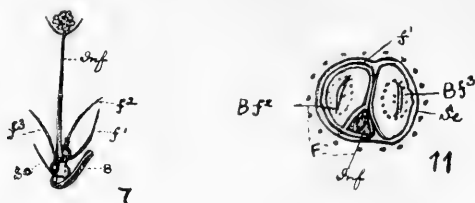


Fig. 7.—Longitudinal diagram to illustrate development of similar bulb to 6. B, bulb; sc, sheathing scale leaf;  $F^1$ , foliage leaf the base of which sheaths the inflorescence and foliage leaf  $F^2$ , but does not thicken;  $F^2$ , inner foliage leaf;  $F^3$ , foliage leaf from axil of sc; the bases of  $F^2$  and  $F^3$  become bulbs; INF, inflorescence.

Fig. 11.—Transverse section (diagrammatic) of fig. 10; sc, and  $F^1$ , show positions of leaves, (now scars), so lettered in figs. 6 and 7.

NOTE.—Figs. 10 and 11 are reversed in position from fig. 6.

leaf  $F^3$  is the first of a bud from the axil of the sheathing scale leaf that surrounds all the leaves just mentioned, as well as the inflorescence.

As the short piece of axis which bears the scars and roots below the bulbs decays somewhat slowly, the two new bulbs are held by it for another year. When, as is sometimes the case, two pairs of bulbs are attached, this piece of axis has persisted two years, and above it there will be a similar piece to each pair of bulbs. The new bulbs being formed a little above the old ones, shows the necessity for an annual crop of contractile roots to pull them to the proper level, otherwise a few years would suffice to bring them to the surface. These roots are replaced chiefly whilst the new bulbs are forming—the old ones decay in June and July—and appear to perform their work during Summer and Autumn.

When the leaves are performing their functions above ground some supplementary fine thread-like roots are given off to assist in the absorption of water, etc.

Mention has been made of the ring of rigid fibres that surround the bulbs: these are the fibres of the previous bulb remaining after the fleshy part has disappeared. They may be looked upon as an additional protection to the new bulbs against possible gnawing enemies. To my mind, they are very suggestive of the iron palisades placed around trees to prevent horses, etc., from gnawing the bark.

In several bulbs which I procured, most of the fleshy portion had been scooped out. In one of them the 'Leather-Jacket'

—the larva of the Crane Fly or Daddy-long-legs, was found. This greedy little monster, while in my possession, scooped out the contents of two other large bulbs—*i.e.*, the fleshy part of the bulb itself. Thus it had certainly eaten three, and most probably others previous to its capture, before an accident put an end to further depredations.

Frequently new bulbs may be found that appear to have been formed with great difficulty, probably due to such mischief as that caused by this grub to the old bulbs. In spite of so many precautions, therefore, it would seem that the wood garlic has still to fight against subtle enemies.

It frequently happens that when the bulbs have been buried below the average depth by miniature landslips—so common a feature in woodlands having a stream flowing through them—or with river silt, provision is made to restore the next bulb to the normal level. In these cases the otherwise short piece of axis (just sufficient to hold the various leaves—no more) becomes elongated between the sheathing scale leaf and the

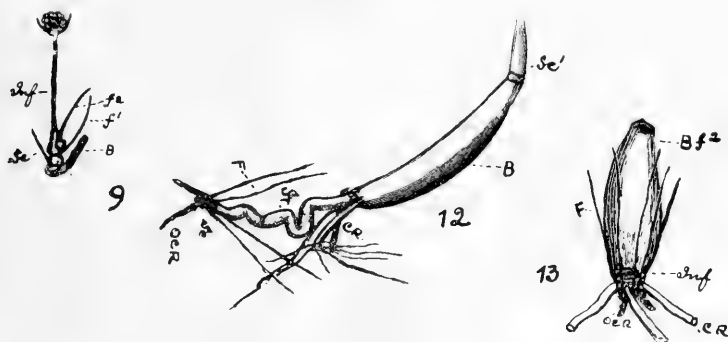


Fig. 9.—Longitudinal diagram to illustrate development of similar bulb to 8; letters as in figs 6 and 7; base of  $F^2$  becomes new bulb.

Fig. 12.—A remarkable bulb. *st*, solid elongated internode; *sc*, scar of last year's scale leaf; *sc¹*, new scale leaf; other letters as in previous figures.

Fig. 13.—Single bulb, the result of development of one similar to fig. 8.  $BF^2$ , base of leaf  $F^2$  in figs. 8 and 9; other letters as in fig. 10; roots cut short.

outer foliage leaf. Fig. 12 is an accurate sketch of a bulb having this piece of stem (an elongated solid internode) developed, though in this particular example it was formed to carry the new bulb from under a stone by which it had been accidentally covered.

From this sketch it will be seen that its behaviour

must have been remarkably like that of a root working round obstacles in stony ground. Several others somewhat like it occurred in the same patch—a number of stones from an adjacent wall having been pushed over them. These large stones are frequently disturbed, and so many of these plants must thereby be placed in jeopardy. So long as the stones are there, examples more or less like that depicted are likely to occur. Typically, when formed expressly for the purpose of raising bulbs these elongated internodes are straight and vertical.

Amongst a number of abnormal flowers I have gathered, there have been examples with four, five, six and, in one instance even seven, lobes (carpels) to the ovary.

## MUSEUM NEWS.

The **Warrington** Museum continues to issue its printed slips of 'Recent Additions,' in the April issue of which we notice that over a thousand dried plants, mostly local, have been mounted and added to the collection. There are also some useful antiquities. It would be an advantage if these lists of additions were numbered.

Mr. F. Elgee has 'edited' [query 'written'] an official guide to the Dorman Memorial Museum, **Middlesborough** (20 pp., price not stated). It begins with a brief 'History of the Museum Movement in Middlesborough,' and includes a description of the more important exhibits. Amongst the geological specimens we notice 'two new species—*Pleuromya navicula*, and a new coral—*Isis Liassica*,' from which it would seem that the meaning of the words 'new species' is not quite clear. An interesting exhibit is Banks' Ribbon Fish, fifteen feet long, taken at Seaton Carew in 1866. There are several illustrations from photographs, some of which would have been more useful if a scale had been shewn.

The Report of the **Colchester** Museum for 1909 (40 pp., 2d.), contains an excellent list of additions, and is illustrated by several good plates from photographs of important objects of Roman, etc., date.

A handbook to the weapons of war and the chase has been issued from the **Horniman** Museum, Forest Hill (73 pp., with plates) at the low price of 2d. The book has been written by Dr. H. S. Harrison, and edited by Prof. A. C. Haddon.

In the Report of the **Keighley** Borough Museum we learn that the number of specimens and books received by donation is [blank] *being the largest number yet received in any one year.* Mr. Mosley adds, 'last year I told you that you might make the Keighley Museum an object lesson to the country; the above [a letter from a lady in America] not only forecasts the proof, but what it might be to the world.'

The trustees of the late A. A. Pahud, J.P., of The Limes, Westgate, **Louth**, have made a grant of £250 towards the building of a new museum for the Louth Antiquarian and Naturalists' Society.

The **Bowes** Museum at Barnard Castle was re-opened to the public on Whit Monday at 10 o'clock, and will in future be open, free, on every week-day.

The **Beverley** Corporation has adopted the Museums and Gymnasiums Act, for the benefit of its recently formed museum.

Mr. L. Fletcher, F.R.S., keeper of the Department of Mineralogy, British Museum, has been appointed Director of the Natural History Departments at **South Kensington**.

## THRUSH STONES AND *HELI* *NEMORALIS* L.

E. ADRIAN WOODRUFFE-PEACOCK, F.L.S., F.G.S.

(Continued from page 174).

The following signs require explaining. A single '[' before a formula, implies entire confluent lip banding, as [11235425]. In this shell the fifth band was absent, excepting at the lip. The sign '[U' implies the confluence of the three upper bands at the lip, as [U(112)234425; a most unusual form. The sign '[L' the confluence of the two lower bands, as [L112324524; this form is common enough. The sign '[UL' implies the confluence of the three upper bands together, and the confluence of the two lower together, with the third interspace clearly marked, as [UL(112)224(425).

Frequently the fifth band is not the normal width below, and there are many shells which can only be indicated thus:—11223442[32]. There is also a very rare shell on which the bands are not in exactly the normal position. It can be indicated thus [01]11234425. The absence of a band is indicated by the size of the figure, as 111334326, where the third band was not present. There is also the production of an extra band or bands. Such forms may be recorded as—[11223[111]525. Much more rarely we find it thus—[11223[112]425, or [11223[11111]325. Then there is the contrast, where the band has a white interspace, as 1122[111]4425. All these are typical specimens from this parish.

There are two sources from which specimens may be obtained for comparing the supply furnished by any locality with those that are destroyed by the thrushes at their anvils on the spot.

The first supply is the 'dead shells'—perfect specimens—which may be found at any place frequented by *H. nemoralis* L. In the case of these specimens, as soon as I have taken off the banding and interspacing, I crush them underfoot, so as not to record them again. The second source of supply is the living molluscs, which may be obtained on the 'crawl' any damp summer evening. As one grows older and more sympathetic, I suppose, one grows more and more chary of taking life needlessly. At least I find, I personally hate more and more the act of destroying the molluscs to preserve their shells in the county collection. So I take a vasculum out with me when I

am working living shells, record the banding and interspacing on my note-sheets as I pick them up, and slip them into the tin when done with. As I return from collecting, I place them at some well-recognised spot, I never collect at—my dumping grounds, as I call them.

The relationship of colouring and banding to soils and local environment I must leave to future papers on the local records I have collected, with the help of friends. I can speak with some little experience now, as I have burnt ten thousand sheets recording one specimen each. Willingly would I have kept them for use, but as they were on five different methods of recording, I could do nothing with them. It is difficult to record shells properly on any method—to translate one method into another is beyond my wit, at least. Though the shells are destroyed, the facts they illustrated are substantiated by the notes I possess on the method suggested here.

Why *libellula* (Risso) should vary from seventy to eighty per cent. on fresh water alluvium, and be entirely absent at thrush stones in a Lincolnshire limestone quarry, I cannot say. Why there should be less *castanea* (Moq.) than either *libellula* (Risso) or *rubella* (Moq.), under all the varying circumstances, I have met with, seems inexplicable. The more you know, the more profound seem the problems which confront you. Perhaps, with the assistance of other workers, some of them may finally be solved.

It would seem, too, that there is a relationship between 'indistinct,' 'intermittent,' or 'broken banding,' and certain soils. On arid parti- or multi-coloured sea-sand banks, with little grass growth, this type of banding is unusually frequent, and seems to act as a protection to the mulluscs against their enemies. Neo-Lamarckism, or the modern evolution, would account for the prevalency of such banding in suitable localities. I know this is not the explanation generally given, but it seems to accord best with the facts which may be observed. Two quite independent matters seem to be confused by the common interpretation. First, the physical cause for broken banding first arising; and secondly, the far more important question from the evolutionists' point of view:—What has maintained it, and made it hereditary? Facts and fancy are widely distinct, but are yet allied. True science loves facts, but is ever seeking to arrange them by methods suggested by imagination, *i.e.*, co-ordinated fancy. It may only be a coincidence and nothing

more between the varying forms of environment and the banding, or other peculiarities of their associated land shells. The facts would not remain inexplicable were our knowledge full enough. I will give an illustration from another shell. In a Hibaldstow limestone quarry, where *Gentiana Amarella* L. abounds the season through on the arid rock of the quarry floor, *Helix hortensis* Müller + *liliacina* (Taylor), in its dark form, may always be found in small quantities at thrush stones. When the colour of the flowers of this plant is taken into consideration, the fact is remarkable. When we know that this quarry is the only locality for this dark variety of *H. hortensis* known in Lincolnshire, and the plant is found nowhere in the same quantity and variety in size, the fact is still more remarkable.

I have no large quantity of banded shells from soils sufficiently varied, to test whether a simple formula like that I have suggested for *H. nemoralis* can be worked out for them. There is, however, a law of destruction by thrushes in the case of *H. aspersa* L., and *H. hortensis*, my notes are sufficient to prove. I must leave it to others who are interested to work out a formula and the law fully by its aid. *Helix virgata* Da Costa appears to me the most difficult banded shell we have to make a useful formula for.

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**The Scientific Feeding of Animals**, by Prof. O. Kellner. Duckworth & Co., 1909. 404 pp., 6/- net.

For some time there has been the need for a good treatise on the scientific feeding of animals, and we certainly consider that the publishers could not have supplied the want better than by a translation of Prof. Kellner's well-known work, which has already appeared in seven languages. Dr. W. Goodwin, of the South-Eastern Agricultural College, has made the translation, and has placed all English students and practical farmers and breeders of cattle under a deep debt of gratitude. The volume is not too technical, and is well produced.

**British Birds in their Haunts**, by the late Rev. C. A. Johns. Edited and revised by J. A. Owen. London: George Routledge, 326 pp., 7/6 net.

Notwithstanding the recent flood of 'bird' books, we can say that the present volume is one that we are glad to see, and is one of the few that we can recommend to the serious student. It is sound and thorough, and not full of the silly twaddle which most people who have a field glass and library think they can produce for the benefit of the bird-loving world. Besides much useful and reliable information about the various species, the accounts abound with interesting narrative. But the feature of the volume which will appeal to most ornithologists is the excellent series of sixty-four coloured plates, upon which there are two hundred and fifty-six figures. These are particularly faithful representations of the birds, being neither too gaily coloured, nor too clumsily drawn. Having regard to the price of the book (7/6 only), the illustrations are certainly the best of their kind that we have seen for some time, and are likely to prove most useful to the field ornithologist.

## THE PHYTOPLANKTON OF THE ENGLISH LAKE DISTRICT.

WM. WEST, F.L.S.,  
AND  
G. S. WEST, M.A., D.Sc., F.L.S.

(Continued from page 193).

After carefully considering the occurrence of *Asterionella* in the British lakes, we are compelled to agree with Wesenberg-Lund that Whipple's explanation is insufficient to explain the great maxima which occur with a considerable degree of regularity in so many of these lakes. Whipple's observations were carried out in reservoirs and in the laboratory, and not under conditions such as obtain in large lakes of considerable depth. In the first place, it is unlikely that any living individuals would exist at the bottom of a deep lake; and assuming they did, it would be quite impossible for them to be raised up from the bottom, either by storms or convection currents, in sufficient quantities to cause an enormous maximum in the plankton. Moreover, although *Asterionella* attains its maxima in both spring and autumn, many other plankton-diatoms have only one maximum, and in some species this is attained in the winter and in others in the summer.

In stormy times, large numbers of individuals are probably carried into the plankton from the littoral region, and this doubtless accounts for the sudden maxima of certain plankton Diatoms a few days after a storm, such as in those cases recorded both by Whipple and Wesenberg-Lund.

We think, however, that the supply of plankton-recruits from the littoral region would be totally insufficient to cause the enormous maxima which occur regularly in certain plankton-species unless the other determining factors were of the most favourable nature. These determining factors would most probably be temperature, food-supply, and aëration of the water.

It would appear that temperature is a factor of importance, as the vernal and autumnal maxima occur at approximately the same water-temperature. This temperature (about 7°—8°C.), is probably the optimum for *Asterionella gracillima*. In the spring the food-supply would be at its greatest because of the large quantity of decomposed organic matter accumulated in



the water. In the autumn, there would also be an increase in the available food-material due to the death and decomposition of short-lived summer forms, and also to the slight concentration of dissolved material in the water poured into the lakes. The aëration would obviously be greatest in the times of greatest disturbance of the surface-water.

It is also probable that the intense light of the summer is detrimental to any great increase of *Asterionella*.

*Cyclotella compta* has two maxima, one in June, and one in September, but these are not nearly so well marked as in *Asterionella*.

On the whole, most of the Diatoms attain their greatest abundance in the autumn. A few species never completely disappear from the plankton, and can be found in the living state throughout the entire year. Such are *Surirella robusta*, *Asterionella gracillima*, and *Tabellaria fenestrata* var. *asterionelloides*.

The characteristic var. *asterionelloides* of *T. fenestrata* was most abundant in September, with the highest water-temperature, and scarce during the cold winter months. The typical chain-form of this species with a zig-zag disposition of the frustules, which is also the normal littoral and pond form, was only observed in the plankton in the month of June. There is no evidence in this lake of any seasonal change from spring forms with a zig-zag disposition of the frustules to pelagic summer and autumn forms with star-dispositions, such as is mentioned by Wesenberg-Lund to occur in Denmark. The chain-form was not observed in the plankton until the star-dispositions were quite common, and it was only seen in that one month. It would thus appear that the var. *asterionelloides* is well established in Windermere, and that the small maximum is due solely to the multiplication of perennial colonies. Practically no variation in the frustules of these colonies was observed, the somewhat elongated proportions being very consistently maintained through the entire year.

MYXOPHYCEÆ. Of the few members of this group found in the plankton of Windermere, *Celosphaerium Kützingianum* is the most conspicuous, attaining its greatest abundance in September (temp. 14.4°C.), in which month four out of the seven recorded species of blue-green Algæ occur.

*Oscillatoria Agardhii* occurs in gradually diminishing quantity from September to December (temp. 14.4°—3.2°C.).

TABLE OF PHYTOPLANKTON.

In this table the relative frequency is indicated thus :—very rare, 'rr'; rare, 'r'; infrequent, 'ir'; fairly common, 'c'; common, 'cc'; and abundant, 'ccc.'

SPECIES.	1907.												1908.											
	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June	July	August
CHLOROPHYCEÆ.																								
<i>Eudogonium</i> sp. (sterile)	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr
<i>Microspora abbreviata</i> (Rabenh.) Lagerh.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Ulothrix zonata</i> (Webr. & Mohr.) Kütz	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Spirogyra</i> sp. (sterile)	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr
<i>Cosmarium Botrytis</i> Menegh.	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr
" <i>subtimum</i> Nordst. var. <i>Klebsii</i> (Gutw.) W. & G. S.	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr
" <i>depressum</i> (Näg.) Lund. var. <i>achondrium</i> (Boldt) W. & G. S.	c	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr
" <i>Turpinii</i> Bréb.	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr
<i>Nannidium subhasitum</i> West var. <i>Murrayi</i> W. & G. S.	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr
" <i>autlopaum</i> (Bréb.) Kütz. var. <i>depauperatum</i> W. & G. S.	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c
<i>Arthrodesmus triangularis</i> Lagerh. var. <i>subtriangularis</i> (Borge) W. & G. S.	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr
<i>Staurostrum paradoxum</i> Meyen	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr
" var. <i>longipes</i> Nordst.	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr
" <i>pseudopelagicum</i> W. & G. S.	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr
" <i>curatum</i> West	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr
" <i>jaculiferum</i> West (forma <i>triradiata</i> )	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr
" <i>cuspidatum</i> Bréb. var. <i>maximum</i> West	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr

SPECIES.	1907.					1908.							
	Sept.	Oct.	Nov.	Dec.		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
<i>Staurastrum lunatum</i> Ralfs var. <i>planctonicum</i> W. & G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Spondylosium pulchrum</i> (Bail.) Arch. var. <i>planum</i> Wolle	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Desmidiium apogonum</i> Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Eudorina elegans</i> Ehrenb.	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Pediastrum Boryanum</i> (Turp.) Menegh.	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>glanduliferum</i> Benn.	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Ankistrodesmus falcatus</i> (Corda) Ralfs var. <i>acicularis</i> (A. Br.)	..	..	..	..	..	..	..	..	..	..	..	..	..
G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Dictyosphaerium pulchellum</i> Wood	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Oocystis lacustris</i> Chodat	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Nephrocytium lunatum</i> West	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Botryococcus Braunii</i> Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Sphaerocystis Schroeteri</i> Chodat.	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Tetraspora lacustris</i> Lemm.	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Glaucocystis gigas</i> (Kütz.) Lagerh.	..	..	..	..	..	..	..	..	..	..	..	..	..
BACILLARIEÆ.													
<i>Melosira granulata</i> Ralfs.	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Cyclotella compta</i> Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Rhizosolenia morsa</i> W. & G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Tabellaria fenestrata</i> (Lyngb.) Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..
" var. <i>asterionelloides</i> Grun.	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>flocculosa</i> (Roth) Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Synedra radians</i> (Kütz.) Grun.	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>Ulna</i> (Nitzsch) Ehrenb.	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Asterionella gracillima</i> Heib.	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>formosa</i> Hass.	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>Fragilaria capucina</i> Desmaz.	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>crotoneensis</i> (A. M. Edw.) Killion	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Navicula radiosa</i> Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..
" <i>viridis</i> Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..

SPECIES.	1907.					1908.						
	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
<i>Navicula major</i> Kütz. ..	..	..	..	..	III	III	..	..	..	III	..	..
<i>Stauroneis Phaniceron</i> Ehrenb. ..	..	..	III	..	..	..	..	..	..	III	..	..
<i>Cocconeis cymbiforme</i> Ehrenb. ..	..	..	..	..	..	..	..	III	..	III	..	..
<i>Gomphonema constrictum</i> Ehrenb. ..	..	..	..	..	..	..	..	III	..	..	..	..
<i>olivaceum</i> (Kütz.) Grun. ..	III	..	..	..	..	..	..	III	..	..	..	..
<i>Nitzschia Palea</i> (Kütz.) Grun. ..	..	..	..	..	..	..	..	III	..	..	..	..
<i>Epithemia turgida</i> (Ehrenb.) Kütz. ..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Amphora ovalis</i> Kütz. ..	..	III	III	III	III	III	III	III	III	III	III	III
<i>Surirella biserialis</i> Bréb. ..	I	III	III	III	III	III	..	III	..	..	..	..
<i>robusta</i> Ehrenb. ..	III	III	III	III	III	III	..	III	..	..	..	..
" var. <i>splendida</i> (Ehrenb.) V. H. ..	..	..	..	..	..	..	..	..	..	..	..	..
MYXOPHYCEÆ.												
<i>Anabaena Lemmermannii</i> Richter ..	II	..	..	..	..	..	..	..	..	III	II	II
<i>Oscillatoria Agardhii</i> Gomont ..	II	II	II	III	..	..	..	..	..	..	..	..
<i>rubescens</i> D.C. ..	III	..	..	..	..	..	..	III	..	III	..	..
" <i>tenuis</i> Ag. ..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Calosphaerium Kützingianum</i> Näg. ..	C	I	II	III	III	..	..	..	..	..	..	..
<i>Microcystis pulverea</i> (Wood) Migula. ..	..	..	..	..	III	..	..	..	..	..	..	..
" <i>aeruginosa</i> Kütz. ..	..	..	..	..	..	..	..	..	..	..	..	..
FLAGELLATA.												
<i>Synura uella</i> Ehrenb. ..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Mallomonas longiseta</i> Lemm. ..	..	II	I	C	II	II	III	..	III	..	I	C
<i>Dinobryon cylindricum</i> Imhof. ..	..	..	..	..	..	..	..	..	..	III	..	C
" var. <i>divergens</i> (Imhof.) Lemm. ..	C	II	..	..	..	..	..	..	..	..	..	..
PERIDINIEÆ.												
<i>Ceratium hirundinella</i> O. F. Müll. ..	III	III	II	..	..	..	..	..	III	III	I	C
<i>Peridinium Williei</i> Huttfield-Kass. ..	III	III	III	III	..	..	..	..	..	III	..	C

*Anabæna Lemmermanni* was observed during the warmest period from June to September, and the development of the spores took place from July to August.

PERIDINIEÆ. The ubiquitous *Ceratium hirundinella* makes its first appearance in May, increases considerably in June and July, and is most abundant in August (temp. 12.7°C.), after which it gradually diminishes until its complete disappearance in the middle of December (consult text fig. 3). We have never found it in any great quantity in any of the English lakes, and it is always a seasonal plankton constituent with a summer maximum. The same is true of the large pools of the Midlands of England.\* In the more southern continental lakes, it is a

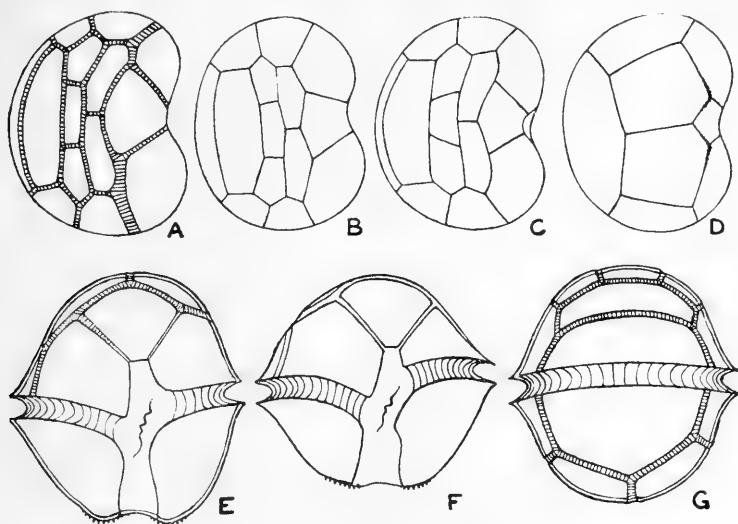


Fig. 4. *Peridinium Willei* Huitfeldt-Kaas. A.-C., epivalve of three individuals showing limits of variation in apical plates; D., hypovalve; E. and F., ventral views of two individuals; G., dorsal view. All  $\times 500$ . The areolations of the plates are not indicated in the figures.

perennial constituent of the plankton,† but in the more northern lakes of Germany, Denmark, Russia, and Scandinavia, it completely disappears in the colder months, as in the British

\* G. S. West, 'A Biological Investigation of the Peridiniæ of Sutton Park, Warwickshire,' *New Phytologist*, 1909.

† Brahm & Zederbauer, 'Beiträge zur Planktonuntersuchung alpinen Seen, II.', *Verhandl. k.k. Zool.-Botan. Ges. Wien*, 1904; G. Entz, 'Beiträge Kenntniss des Plankton der Balatonsees,' *Result. der wiss. enforschung des Balatonsees*, II. Bd. Budapest, 1904; Lemmermann in 'Archiv. für Hydrobiol. u. Planktonkunde,' III., 1908.

lakes. Careful measurements and drawings from September 1907 to August 1908 showed that no seasonal form-variation of this organism occurred in Windermere for at any rate the twelve months it was under observation, although Wesenberg-Lund\* has recorded such variations in the lakes of Denmark.

The only other species of this group was *Peridinium Willei*, and the collections showed the same sudden rise in the summer months and gradual decline in the autumn as was exhibited by *Ceratium hirundinella*, the maximum being attained in August. In two Italian lakes (Lago di Varano and Lago di Monate) this species has been found by Lemmermann† to be a perennial constituent of the plankton.

FLAGELLATA. *Mallomonas longiseta* appears first in October, and as the temperature diminishes, its activity increases. It reaches its greatest abundance in December (temp. 3.2° C.) and then rapidly dies down, completely disappearing in March. It thus appears to be a cold water type, thriving during the autumnal fall in temperature.

*Dinobryon cylindricum* var. *divergens* has a considerable maximum in September, in which month the temperature of the water is the highest (14.4° C.). This same variety occurred in very large quantity in Derwent Water in the month of June 1903. Lemmermann has also observed it more especially in the warm period, and quite recently it has been found to attain its maximum in the hot months in an Australian lake.‡

#### IV.—SYSTEMATIC ACCOUNT OF THE MORE NOTE-WORTHY SPECIES.

Among the various constituents of the phytoplankton of the English lakes, a number of species are of sufficient interest to merit special mention. Of the following 28 species, one is here described for the first time (*Dinobryon crenulatum*), one is new to Britain (*Elakatothrix gelatinosa*), and 13 are new to England.

##### CHLOROPHYCEÆ.

I. BINUCLEARIA TATRANA Wittr. in Wittr. & Nordst. Alg. Exsic. 1886, No. 715; fasc. 21, 1889, p. 18 (c fig.); G. S. West, Treatise Brit. Freshw. Alg. 1904, p. 80, fig. 25.

\* Wesenberg-Lund, *l.c.*, 1908, p. 69.

† Lemmermann in 'Archiv. für. Hydrobiol. u. Planktonkunde,' III., 1908, pp. 357, 361.

‡ G. S. West in 'Journ. Linn. Soc. Bot.', XXXIX., 1909, pp. 17, 18.

This Alga occurred in a more or less fragmentary condition, in the plankton of Codale, Easedale, and Stickle Tarns. It was obviously merely washed in from the shores, and has therefore been excluded from the table of phytoplankton. It is not uncommon at the margins of subalpine tarns and lakes, especially if boggy, but is not always easy of recognition. The filaments are from 6-9  $\mu$  in diameter.

2. GONATOZYGON MONOTÆNIUM De Bary var. PILOSELLUM Nordst. in Wittr. & Nordst. Alg. Exsic. 1886, No. 750; fasc. 21, 1889, p. 48.

This rare variety has not previously been recorded for England. It is well characterized by the short spinate projections which replace the minute granules of the type form. The cells were 9-11  $\mu$  in diameter, and in this variety they are generally somewhat narrower than in the type, with slightly less dilated extremities. We have recorded it from the plankton of Loch Fadaghoda in the Outer Hebrides, and we have found it in other localities in Wales and Ireland.

3. CYLINDROCYSTIS DIPLOSPORA Lund. var. MAJOR West in 'Journ. Linn. Soc. Bot.', XXIX., 1892, p. 131, t. 20, f. 3; W. & G. S. West in 'Journ. Roy. Micr. Soc.', 1894, p. 4, t. 1, f. 9; 'Monogr. Brit. Desm.' I., 1904, p. 61, t. 4, f. 42, 43.

This large variety was not uncommon in the plankton of Ennerdale Water. Long 125  $\mu$ ; lat. 62  $\mu$ . It is known to occur in several British localities, and the first English record was from Riccall Common in East Yorkshire.

4. MICRASTERIAS PINNATIFIDA (Kütz.) Ralfs, 'Brit. Desm.', 1848, p. 77, t. 10, f. 3; W. & G. S. West, 'Monogr. Brit. Desm.', II., 1905, p. 80, t. 41, f. 7-11, 13.

This pretty little species is known to occur in the bogs of the Windermere drainage basin, and we have observed it sparingly in the plankton of Ennerdale Water. It appears to be confined to the old formations of the western mountainous areas of the British Islands; and in parts of the west of Ireland and north-west Scotland it is frequent in the bogs and lakes.

5. MICRASTERIAS RADIATA Hass. 'Brit. Freshw. Alg.', 1845, p. 386, t. 90, f. 2 [figure bad]; W. & G. S. West, l. c., p. 113, t. 51, f. 1-9. *M. furcata* Ralfs and other authors.

Like the preceding species *M. radiata* is one of the western types of the old formations. It occurred in the plankton of Easedale Tarn, this being the first English record. Long 187  $\mu$ ; lat. 170  $\mu$ ; lat. isthm. 23  $\mu$ .

## FIELD NOTES.

### MAMMALS.

**Porpoises in the River Hull.**—Several porpoises have lately visited the River Hull. They ascended the river on Tuesday, May 17th, at 4 o'clock in the morning. As they passed under Sculcoates Bridge unsuccessful attempts were made to procure them with boat hooks. They were afterwards seen at Hull Bridge, near Beverley, still swimming up the stream. At least one got as high up the river as Hempholme Lock, and narrowly escaped being shut up in the lock-pit which it had entered, just making its exit in the nick of time. This lock is some twenty miles from the Humber, and to the knowledge of frequenters of this stream for many years, no porpoise has previously been known to ascend it. One of these enterprising animals being in a dazed condition, was caught and killed by a house-boater on the Friday, in the neighbourhood of Mikla Dike. It proved to be 48 lbs. in weight, was forty-six inches long, with a girth of twenty-five and a half inches. Its skin bore evidence of having been peppered with small shot, which, no doubt, accounted for its easy capture.—H. M. FOSTER, Hull.

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### BIRDS.

**White Wagtail in Wharfedale.**—Whilst strolling along the banks of the River Wharfe at Arthington on April 6th, I was rather surprised to see two White Wagtails amongst a number of Pied Wagtails. The Pied and White Wagtails were often very near each other, and I was able with little difficulty to see the characteristic differences in the plumage between the two.—S. HOLE, Leeds.

**Curious Accident to a House Martin.**—A House Martin in difficulties was recently discovered in the middle of the road at Harrogate. The bird was unable to fly, as a long hair had become entangled in its foot, and had then twice encircled the left wing. After the hair was removed the bird flew away. This is a sample of the many curious accidents to which birds are liable.—R. FORTUNE, June 11th, 1909.

**Golden Oriole at Gainsborough.**—On the 12th instant, walking with my daughter by the side of the Bale, a narrow wood bounding Thonock Park, on the south, we had the good fortune to see a Golden Oriole feeding on the bank between this wood and the high road. We watched it several times as it



kept flying on in front of us ; and in one place we got to within about a dozen yards of it before it flew away. It was very busy picking up insects from off the bank, as is its wont before the fruit time arrives.—F. M. BURTON, Highfield, Gainsborough, May 1909.

**Wood Pigeon Diphtheria.**—There has been great interest taken in this enquiry, although, according to the reports, Yorkshire birds seem to have escaped the contagion. I have been on two estates this April, and there the keepers seem to think the birds shot have been in good condition. Strange to say, on April 3rd, I picked up a dead Stock Dove at Eshton that had undoubtedly died of this infectious disease, its gape being one mass of cheese-like matter. Its eyes were bright, so that it had probably been dead only a day or so ; the body thin, breast-bone very prominent ; plumage exceptionally good.—W. H. PARKIN.

**Broken Eggs under Herons Nests.**—Whilst on a visit to the heronry near Gargrave on April 3rd, 1909, I again noted dropped eggs under the nests. On this occasion there were only three broken under say ten brooding birds' nests. In other years I have noted considerably more, in fact, one year it was possible to tell easily which nests were occupied by the broken egg or eggs underneath—these mostly fresh or only very slightly incubated eggs. I have always assumed that this loss was due to the indifferent platform nests. Possibly the early eggs become affected by the frost, and, on being sat, break more easily and are thrown out.—W. H. PARKIN.

**Rook Law.**—Referring to Mr. F. M. Burton's article in 'The Naturalist' for April ; some years ago I witnessed the following occurrence, on what is known as a shard, *i.e.*, a large island in the middle of the river Lune at Lancaster.

Some two miles up the river is the village of Halton, where there is a large rookery, and from this I noticed a number of birds come flying and chattering. They settled on this shard, opposite the house I was then living in. The proceedings were almost identical with those described by Mr. Burton. The birds on alighting gathered in a circle several yards across, leaving one of their party in the centre. Silence at once ensued, and after a few seconds only, eight rooks deliberately advanced towards the bird in the centre, and quickly killed it with their beaks. It never offered to escape or defend itself. Immediately the work was done, the whole assembly rose in the air, and with loud cawings, flew back to the rookery.

I went across to the island at once, and found the bird quite dead, but warm. I could find no trace of cuts or blood.—  
H. B. TURNEY, Ulverston.

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### FLOWERING PLANTS.

***Euphrasia Rostkoviana* Hayne—a new Yorkshire Eye-bright.**—On September 10th, 1908, I found this rare Eyebright near Warthill Station in v.c. 62. It is an addition to the flowering plants of Yorkshire. Its census number for Great Britain is 35 out of 112, and therefore it is a decidedly rare plant. It is very tall compared with the other British Eyebrights and grows scattered over waste ground.—WM. INGHAM, B.A., 14th May, 1909.

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### MOSESSES.

***Tortula cernua* Lindb.—A Second Yorkshire and also British habitat.**—On page 1 of 'The Naturalist' for 1901 is an account of the discovery of this new moss to the British Flora near Aberford. On May 1st, 1909, Mr. T. C. Thrupp of Doncaster sent me a specimen which he found by the side of the River Don, between Doncaster and Conisborough, in v.c. 63, and it proved to be *Tortula cernua*, and in good condition. From Mr. Thrupp's account it seems to be better established near Doncaster than at Aberford, where I understand it is scarce.—WM. INGHAM, B.A., 14th May, 1909.

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### GEOLOGY.

**Mammoth's Tusk at Robin Hood's Bay.**—At a recent meeting of the Scarborough Field Naturalists' Society, there was exhibited a part of a Mammoth's tusk about eighteen inches in length, found in the boulder clay in the neighbourhood of Robin Hood's Bay. It had evidently had a good deal of hard wear as a 'boulder.'—D. W. BEVAN, Scarborough, May 23rd, 1909.

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### NEUROPTERA.

***Libellula fulva* Mull. Re-discovered in its Old Station near Askern.**—On Whit Monday, May 31st, I took a freshly emerged Dragon-fly at Shirley Pool, near Askern. Not knowing the species, I sent it to Mr. Porritt, who identified it as *L. fulva*. Mr. S. L. Mosley recorded the species from near Askern in 1888, but from that time to the present it has been lost as a Yorkshire insect.—H. H. CORBETT, Doncaster, June 1909.

## REVIEWS AND BOOK NOTICES.

**The Young Beetle-Collector's Handbook**, by **Dr. E. Hofmann**. With an Introduction by W. Egmont Kirby, M.D. 3rd Edition. London, Swan, Sonnenschein & Co., Ltd. 178 pp.

We can thoroughly recommend this book to the beginner in the study of the Coleoptera. For so cheap a work, the twenty coloured plates with which it is adorned are excellent, and will prove of great assistance to the young student in naming the larger species. For the smaller species, however, since these are only figured life-size, the illustrations are not quite so useful, although they will enable the tiro to identify genera. As is natural in a book of this character, little attempt is made to describe the smaller species, the greater part of the text and plates dealing with the larger beetles, which it is usually the young collector's first desire to obtain. A few of the beetles referred to are continental; species found in Britain, although far outnumbering the continental-only forms, being distinguished by an asterisk. The letterpress, paper, arrangement and general 'get-up' of the book are commendable, and the volume is provided with an index.

Part 13 of **Wild Beasts of the World** (T. C. and E. C. Jack) contains excellent coloured plates of several of the large mammals, including the giraffe, and the okapi.

**Fossil Plants**, by **E. A. Newell Arber**. Gowan and Gray, Ltd., 1909. 75 pp., 6d. net.

This is issued as No. 21 of this firm's well-known sixpenny 'Nature Books,' and contains reproductions from sixty clear photographs of typical Carboniferous plants, together with several pages of scientific matter by Mr. Newell Arber, whose incorrect initials—E.H.—twice on the cover, seem unfamiliar. To the student of Coal Measure plants these photographs shew almost as well as do the actual hand specimens or microscope sections. They are all correctly named, and work out to more than ten a penny!

**The Natural History of Igneous Rocks**, by **Alfred Harker, M.A., F.R.S., London**. Methuen & Co. 384 pp., 12/6 net.

We are glad to have the opportunity of drawing attention to the excellent volume by a former member of the editorial staff of this journal, Mr. Alfred Harker. The subject has not previously been dealt with in the form Mr. Harker now presents it, viz., from a purely geological or 'natural history' standpoint. The substance of the volume was first prepared in connection with a course of lectures delivered by the author at Cambridge, and all students of petrology will welcome the information in the present readable and easily accessible form. The first portion of the book deals with igneous rocks and igneous action; it then deals with the crystallization of igneous rock-magmas, regarded as complex solutions. In this work Mr. Harker gives the results of his life's work amongst the igneous rocks, and his descriptions are much simplified by the numerous drawings and diagrams in the text. 'The Natural History of Igneous Rocks' will certainly at once take its place in the front rank of solid contributions to the more difficult branches of geological research. We believe we have described the publishers of the work correctly, but the title is so messed up with a quite unnecessary rubber stamp, that all we can trace is 'Mc . . . Co. 36 . . . W.C. ondo.'

**Notes and Jottings from Animal Life** by the late **Frank Buckland**. New Edition. Smith, Elder and Co. 414 pp., 3/6.

Although the title-page of this volume is dated 1909, the preface is still dated 1882. But the book is well known, and the many quaint stories of animal life are quite refreshing. The stories relate to almost every phase of life. We have had to put our copy down two or three times; but a friend at last assured us that the type really *was* like that! Several pages have been printed twice.

## NEWS FROM THE MAGAZINES.

'Four Centuries of Legislation on Birds' is the title of a paper by Mr. W. G. Clarke in the June *Antiquary*.

In 'Notes on *Thysanoptera (Tubulifera)* new to the British Fauna' (*Entom. Monthly Mag.* for June), Mr. R. S. Bagnall describes *Trichothrips semicæcus* from Greatham, near Hartlepool.

The *Country Side's* year-old child, *Country Queries and Notes*, has been re-christened *Science Gossip*. The title may be the title of *Science Gossip*, but the voice is the voice of *Country Queries and Notes*.

Mr. Bernard Hobson writes an interesting and well illustrated article 'With the International Congress in Mexico,' in the number of *The Journal of the Manchester Geographical Society* recently to hand.

We learn from the *Museums Journal* that Mr. Frederick Stubbs, of Oldham, has been appointed to the restricted post of Curator in the Stepney Borough Museum. He is to work under the direction of the Borough Librarian, and be subordinate to that official.

A child in a Lancashire school was asked what was meant by 'the quick and the dead.' The answer was 'the quick is those who can get out of the way of a motor car, and the dead is those that doesn't!'—*Yorkshire Ramblers' Club Journal*.

Mr. Percival Westell has turned spring poet, and in *The Selborne Magazine* for April writes a poem, the first line of which is quite original:—'Hark! to the joyous lark!' Probably his next poem will be 'Hark to the Cuckoo!'

The 'phrases' of a Nightingale are given in a contemporary. One is 'Sosososososososo, czirhayay,' and another 'Sesesesesesesesesese, coar o sze-oi.' The last one we heard giving forth 'phrases' like that ended up with 'rats'!

In the *New Phytologist* for April, Mr. B. M. Griffiths describes two new members of the Volvocaceæ (*Pyramimonas delicatulus* sp. n. and *Chlamydomonas* sp. n. (?) from near Kidderminster, and Mr. A. W. Bartlett writes on 'An Abnormal gynoecium in *Stachys sylvatica* Linn.'

In the *Quekett Club Journal* for April, Messrs. E. Heron-Allen and A. Earland have an important paper 'On a new species of *Technitella* [*T. thompsoni*] from the North Sea, with some observations upon selective power as exercised by certain species of arenaceous foraminifera.'

A writer in the February *Zoologist* records that a Great Bustard was shot at Cloughton, near Scarborough, last Christmas, by Mr. Bennett, who 'took it home, and had it cooked instead of Turkey for Christmas dinner.' In the 'Zoologist' for March, Mr. W. H. St. Quintin points out that the 'Great Bustard' turns out to be a female Silver Pheasant.

From the cover of *The Country Side* for May 8th we learn that 'It would be an insult to the intelligence of our readers' to fill pages 'with dissertations upon such subjects as "How Plants Grow" or "The Development of the Frog."' On opening the paper the first article is found to be entitled 'How Birds Fly'! In the same issue of this journal, which professes to advocate the protection of birds, etc., is an advertisement:—'Will any reader who can procure a clutch of fresh Nightingale eggs communicate,' etc.

We notice the following modest statement in an article on Mendelism in a contemporary. 'I have not read any of the work of the scientists mentioned [Bateson, Punnett, Hurst] . . . but Mendelism seems to me to be only an elaborate and precise enunciation of principles which I have myself laid down in articles published at intervals during the last twenty years. . . . I see nothing in Mendelism which I have not been saying for many years.' We need not say who the writer is; only one man would write it. And oddly enough his work does not receive the credit he thinks it should by any of the 'scientists' quoted. In fact they do not mention his name.

# THE NATURALIST.

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T. SHEPPARD, F.G.S., F.S.A.Scot.,

THE MUSEUM, HULL;

AND

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TECHNICAL COLLEGE, HUDDERSFIELD.

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF

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RILEY FORTUNE, F.Z.S.

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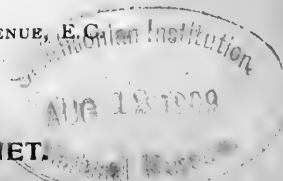
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## NOTES AND COMMENTS.

### SALMON SCALES.\*

Under this title Mr. J. A. Hutton has published a most instructive lecture, which is illustrated by several plates. In this the author demonstrates that it is possible to write a fairly good account of the life history of a salmon from an examination of a single scale. Assuming that the date of the capture of the fish is known, Mr. Hutton shews that it is possible to say when the fish was hatched, when it migrated to the sea ; its subsequent travels in and out of the river ; when it spawned, etc. ; all this and more from a careful examination of the lines of growth on a scale.

### A PRE-HISTORIC MAN HUNT.

In the 'Transactions of the Lincolnshire Naturalists' Union,' which will be independently noticed elsewhere, is a paper with the tempting title, 'Pre-historic Man in Lincolnshire,' by the Rev. A. Hunt, whose extraordinary contributions to Lincolnshire ethnology we have previously had occasion to refer to. He dilates upon Eolithic Man, Palæolithic Man, and Cave Man, and then we find that none of these occur in Lincolnshire ! The paper then professes to give an 'inventory of all the pre-historic remains found in the county, and we again hear, of course, of the mythical 'Pygmy Race.'

### A CASE OF COURTESY.

In connection with this paper, the Curator of a certain museum (not in Lincolnshire, but close by), was asked some time ago to supply a complete list of all the pre-historic remains in his collections. The list was a lengthy one, and took some trouble to prepare, but was duly forwarded. Though apparently nearly all the information supplied is used in the lists appearing in the address, no reference whatever is made to the museum, nor to the fact that a list had been supplied. The omission is all the more pointed, seeing that the specimens in two other museums are specially indicated. As the museum in question contains, if not the finest, one of the finest collections of Lincolnshire antiquities extant, the omission can hardly be put down to ignorance. Speaking of the Brigg boat, we find Mr. Hunt writing (p. 293) that it 'is the finest specimen

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\* 32 pp. and 14 plates. London : Sherratt & Hughes, 1/- net.

of a Neolithic boat yet found and preserved to us in England. *It is still to be seen in our county*, in a special shed built to preserve it near Brigg station.' Does it not seem like Fate, that, before Mr. Hunt's paper was published, this grand relic should have left the county, and have gone to that very museum that Mr. Hunt has forgotten all about ?

#### STONE MEMORIALS AND JACOB.

We learn in this paper that vast sheets of ice are *known as glaciers* ! In a photograph of 'Early British Pottery,' there are some pieces which are certainly not early British, nor late British. The custom of raising mounds over the dead is by no means confined to 'Egypt, India, America and Britain.' Sir J. Lubbock is now Lord Avebury ; and what can anybody make of 'Incompleteness of the circle in the Barrow, points to design. Yet neither care nor trouble seem to have been spared in *their* funeral rites.' The exploded idea of bodies in barrows being buried 'facing the sun' is trotted out. Some objects are described which are certainly not pre-historic. We learn, with surprise, that neolithic people did not eat fish. Didn't the pygmies make fish-hooks ? We are correctly informed that there are over 370 barrows in England ; seeing that Yorkshire alone has yielded over double that number, and by we get to the piffle at the end, about Stone and Bronze Ages in *the Bible*, our patience is well-nigh exhausted. 'In the Beginning—*no date given* '!! 'There are Stone Memorials, Jacob,' etc., etc. 'Bronze translated brass is mentioned forty-five times ; Iron, four times,' and surely 'flint' is mentioned too, though we fail to see how this will help us in our 'researches.'

#### PROF. G. S. WEST.

We are pleased to hear that our contributor, Dr. G. S. West, son of Mr. W. West, of Bradford, has been elected to the Chair of Botany and Vegetable Physiology at the Birmingham University. We trust that Prof. West may long live to carry out the excellent work he is doing at Birmingham.

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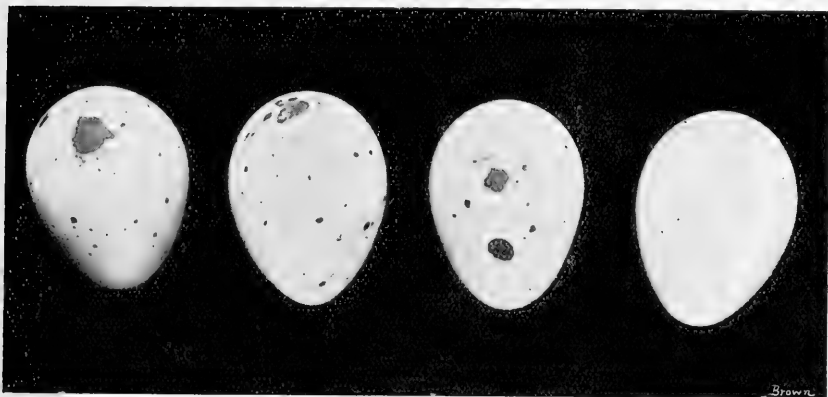
The April *Bradford Scientific Journal* has an 'Introduction to the Study of Grasses,' by Dr. W. G. Smith ; 'Annelid Hunting Round Bradford,' by the Rev. H. Friend ; 'Vegetation of Some Disused Quarries,' by Mr. S. Margerison ; 'Bradford Spiders,' by Mr. W. P. Winter ; and 'The Stonechat in Yorkshire,' by Mr. E. P. Butterfield. In this last article the author contends that the species is not nearly so common as one might be led to believe from Nelson's 'Birds of Yorkshire.'



## DIMORPHISM IN THE EGGS OF *TURDUS MUSICUS*.

C. J. PATTEN, M.A., M.D., Sc.D.,  
*Sheffield.*

BEING recently engaged in research into some points in avian embryology I solicited from gardeners, fruit-growers, and others, donations of eggs of some of our common species. A liberal response brought to me a number of eggs of the House-Sparrow, Blackbird and Song-Thrush, and in more limited numbers eggs of several other species. Some interesting variations in the shells came under my notice, especially in the case of the House-Sparrow and Song-Thrush. In the present paper I will deal only with the latter. I need merely give a passing notice



(C. J. Patten, photo).

1.

2.

3.

4.

**Dimorphism in the Eggs of *Turdus musicus*.**

No. 4 is entirely devoid of spots. In Nos. 1, 2 and 3 the spots, and more especially the large blotches, are reddish-brown. In No. 3 there is, however, a large blackish blotch in addition. The unspotted egg (No. 4) is the longest; No. 2 comes next, both of these eggs being more pointed than the shorter ones Nos. 1 and 3. The measurements are as follows:—No. 1—2·8 cm. by 2·2 cm.; No. 2—2·9 cm. by 2·2 cm.; No. 3—2·8 cm. by 2·1 cm.; No. 4—3 cm. by 2·2 cm. It may, therefore, be observed that in breadth the eggs are practically of the one measurement.

regarding variation in size in which in three clutches each egg measured only 1·8 cm. or 7 mm. below the average as given by Saunders ('Man. Brit. Birds,' Sec. Edit., p. 4), while regarding variation in the distribution and size of the spots, I may mention that in two clutches they were exceedingly small, and wholly confined to the pointed ends.

I now wish to refer in some detail to a clutch in which one egg was entirely devoid of spots. I do not place so much importance in the discovery of a Thrush's egg without spots; it is generally known among ornithologists that such cases are by no means rare, but when the contents were examined in conjunction with the shell, some interesting points cropped up.

These I will refer to in a moment. The clutch in question, of which I give a photograph, consisted of four eggs. They were found on May 30th, 1908, in a perfectly normally-built Thrush's nest, well lined with a wall of dung, bits of rotten wood, and caked moss. The nest was built in a laurel-bush, and, when first discovered, the bird was sitting, and her identity thus secured. The off chance of the unspotted egg being that of a Starling is rendered all the more remote by the fact that Starlings were not breeding in the immediate neighbourhood, nor indeed can I find an instance of a Starling laying in a Thrush's nest. That Thrushes have laid in Blackbirds' nests is a known fact, and there is no reason to doubt that occasionally a Blackbird may take possession of a Thrush's nest. Moreover, the Blackbird has been known to lay blue unspotted eggs. In the present instance, I do not think for a moment that the egg was introduced by another bird into the nest, yet, from the observations made upon it prior to its being blown, suggestions seem to arise regarding the possibility of its being other than a member of the clutch. In measurement it is slightly longer than any of the spotted eggs, but the difference is so trivial as to call for no significance. Indeed, as may be seen from the measurements given below, all the eggs of the clutch exceed the average measurement in length. Its broadest measurement corresponds with two others of the clutch, while the remaining one is only 1 mm. narrower than these. In breadth all the eggs of the clutch may be said to attain to the average measurement laid down. But in the colour and texture of the shell, the unspotted egg, examined unblown, showed two marked peculiarities. The gloss, which was present in the spotted shells, was absent, and the texture of the shell was rougher and more porous.

The other feature attracted my attention still more, namely the difference in the ground-colour. This was much more apparent when the specimen was viewed in strong sunlight. The shell of the unspotted egg appeared lighter in shade, and of a truer blue colour than the shells of the three spotted eggs. But the latter, which shewed a slight greenish tinge, became, when blown, almost identical in shade with the unspotted shell. The reason soon became obvious, for, on blowing out the contents, I was surprised to find that the unspotted shell contained only a remarkably small and very pale yellowish-white yolk, which, amidst the mass of glary albumen was very inconspicuous. Hence the strong light, more or less transmissible through the shell, did not mingle to any extent with a rich and large yellow yolk-ball, and thereby produce a greenish effect.

I was much interested with the aborted condition of the yelk, and it further occurred to me to obtain, if possible, evidence regarding fertility. This I was enabled to do after much delicate manipulation. For the eggs were fresh, and, though the vitelline membrane gave way as the contents were being extruded, still, after a careful search which occupied several hours, I managed to secure the germinal disc, and to isolate it from the yelk in each egg. In the case of the three spotted shells, the germinal discs, which measured 4 mm. in diameter, showed evidence of fertility, for development had proceeded as far as the early indication of the embryonic shield, the primitive streak being barely visible. In the disc of the abnormal egg, there were no traces of developmental activity having taken place, and, to the best of my belief, fertilization had not ensued. Here, then, is an interesting association, viewed in its physiological aspect, between variation in shell structure, absence of the pigmental deposit from the villous membrane of the parent's uterus, an abnormally small sized yelk-ball, which was unusually light in colour, and non-fertility. That there should be any necessary association between arrested activity of the secretion of the pigmental deposit, which is not laid down until the shell is formed, and non-fertilization of the ovum itself, is not at all evident, and further investigation into the matter would be interesting.

I may conclude with a brief reference to the pigment spots on the three other eggs of the clutch. In addition to a general distribution of small circular spots, great irregularly-shaped blotches are to be seen. With the exception of the lower spot on the face of egg No. 3, they are reddish-brown in colour ; indeed, these eggs, especially Nos. 1 and 2, might almost pass for that type of Ring-Ouzel's egg, which one occasionally meets with, displaying a clear bluish ground-colour with discreet brownish blotches. The difference in the black pigment spots seen on some Thrushes' eggs and the rusty reddish-brown on others, depends upon the thickness with which they are deposited. The pigment is naturally dark reddish-brown, and when laid on thinly, appears as such ; a thick coating appears almost black.\* In this clutch, therefore, the pigment was evidently sluggishly secreted and deposited, until after attempts were made to spot three eggs, the secretive power of the gland finally ceased, leaving one egg altogether free from spots.

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\* Just as in the case of the super-posing of hundreds of coloured blood-corpuscles, straw-yellow in shade, gives one the idea of rich red blood.

## PLANTS ON A BRADFORD WASTE HEAP.

JOHN CRYER.

LAST year on a waste heap near Bradford a very interesting series of plants was found growing luxuriantly. Most were casuals; a few were aliens. Amongst the former were *Lepidium ruderales* L., *Coronopus didymus* Sm., *Medicago denticulata* Willd., *Medicago arabica* Huds., *Carum carvi* L., *Solanum nigrum* L., *Marrubium vulgare*, L. Of the last there were two very fine plants, the principal shoot of each being two feet in height, and the lower lateral branches sixteen inches in length.

The Chenopods were well represented. In addition to *Chenopodium album* L. and its varieties, *C. viride* L. and *C. paganum* Reichb., there were fine examples of *C. opulifolium* Schrad, *C. serotinum* L., *C. Vulvaria* L., and two large beds of *C. murale* L. The grasses were also well represented by *Panicum crus-galli* L., *Setaria viridis* Beauv., *Setaria glauca* Beauv., *Polypogon monspeliensis* Desf. (in abundance), *Gastridium lendigerum* Beauv., *Festuca myuros* L. (in abundance), and *Bromus madritensis* L.

Amongst the aliens were *Carthamus tinctorius* L., with its large head of richly coloured orange-red flowers, and *Trigonella caerulea* Ser., with its rich, silky lilac flowers. Three alien grasses were *Bromus tectorum* L., *Bromus unioloides* H. B. and K., and *Deyeuxia forstii* Kunth. = *Agrostis retro-pacta* Willd. *Agrostis retro-pacta* Willd. is not recorded in Dunn's 'Alien Flora of Britain,' nor in Druce's 'List of British Plants.'

Mr. A. Baydon Jackson, Secretary of the Linnean Society, to whom I sent a specimen, writes:—'An interesting find, as it has not been noted as an alien before in England, so far as I am aware.'

It is, I understand, a common Australian grass, and must have been brought over with wool.

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ERRATUM.—On page 253 of the July issue omit the 4th line from the bottom and read:—'This explains the scar of leaf (F<sup>1</sup>) encircling,' etc.

A 'fine specimen of the bony sunfish' was caught at Filey on July 21st. It measured 'about 2 ft. 6 in. in length, and was almost as much across.'

We are pleased to find that Dr. A. R. Dwerryhouse, F.G.S., the President of the Geological Section of the Yorkshire Naturalists' Union, has been appointed lecturer in geology at the Queen's University, Belfast. At the same time we are sorry that this promotion means that Dr. Dwerryhouse leaves Yorkshire.

Naturalist,

# PERMIAN FOSSILS IN THE DONCASTER DISTRICT.

H. CULPIN.

The Permian rocks in the neighbourhood of Doncaster include two limestones separated by a red marl, 30 to 100 feet thick, which contains lenticular deposits of gypsum. The Upper Limestone is about 50 feet thick, and is in beds or layers, with a fossiliferous band near the top. The Lower Limestone is usually about 230 feet thick, and is a massive rock with few signs of bedding. The fossils it contains occur in great abundance near its base. Between the top of the Upper Limestone and the base of the Lower Limestone, organic remains are very rare.

The following fossils have been collected recently from these limestones in colliery shafts and railway cuttings near Doncaster. They have been named through the kindness of Dr. A. Smith Woodward, F.R.S., and are here recorded in the hope that investigation may be stimulated. The activity expected in the near future in the search for coal will provide facilities for the examination of the overlying Permian rocks which it will be a pity to let pass.

From the top of the Upper Magnesian Limestone, the specimens obtained were—*Liebea hausmanni* (Goldfuss), *Schizodus obscurus* (J. Sowerby). These occurred at Bullcroft Colliery, Carcroft, and on the Doncaster avoiding line, near Newton.

From the basement beds of the Lower Magnesian Limestone the collection included—*Liebea hausmanni* (Goldfuss) (*d*) (*e*); *Schizodus obscurus* (J. Sowerby) (*a*) (*b*); *Bakewellia antiqua* (Münster) (*a*) (*b*) (*d*); *Leda speluncaria* (Geinitz) (*b*); *Pleurophorus costatus* (Brown) (*a*); *Straparollus permianus* (King) (*a*); *Dielasma elongata* (Schlotheim) (*e*); *Camarophoria schlotheimi* (v. Buch) (*b*); *Spirifer alatus* (Schlotheim) (*b*) (*c*); *Lingula credneri* (Geinitz) (*b*) (*c*); *Productus horridus* (J. Sowerby) (*a*) (*b*) (*c*); *Fenestella* sp. (*b*); *Penniretepora* sp. (*b*).\*

Some interesting references were made both by Sedgwick and by King—by the former in his 'Magnesian Limestone' ('Trans. Geol. Soc. London,' 2nd series, Vol. III., 1829); by the latter in his 'Permian Fossils' ('Palæontographical Society,'

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\* (*a*) = Brodsworth Colliery; (*b*) = Bentley Colliery; (*c*) = Maltby Colliery; (*d*) = Cadeby Cutting, Dearne Valley Railway; (*e*) = Cutting, S.E. of Doncaster to Conisbrough Road, Dearne Valley Railway.

1850)—to the organic remains in the Magnesian Limestone rocks near Doncaster. Sedgwick pointed out their abundance, generally among the lower and more coherent beds, in the escarpments on both sides of the Don, and at Stubbs Hill and Wentbridge Hill. He stated that many casts of *Axinus* (*Schizodus*) *obscurus* occur at Wentbridge Hill in the lower beds of yellow limestone, and that it is found in a much more perfect form in the lower beds of Stubbs Hill. He mentioned more than once the beautiful small casts of a deeply striated shell, apparently *Turbo*, which occur in the pisolitic yellow limestone between Marr and Hickleton. Casts of a small smooth shell, apparently of the same genus, are rarely found, he said, in the lower beds of yellow limestone near Conisbrough.

King refers to the striated turbos as probably *Turbo man-cuniensis* (p. 206), and to the smooth ones as probably *Turbo permianus* (p. 206). King also alludes to the abundance of *Schizodus obscurus* at Stubbs Hill, and states it has been collected near Elmsall (p. 190).

King's other references to the district are in regard to *Mytilus squamosus*, a specimen of which he figures from Hampole (p. 160); *Bakewellia antiqua* from Hampole, Stubbs Hill, and between Marr and Hickleton (pp. 169 and 170); *Pleurophorus costatus* from Stubbs Hill (p. 182); and *Dentalium sorbii*, discovered by the late Henry Clifton Sorby, from 'Coningsborough, near Doncaster' (p. 218). All these localities are on the Lower Magnesian Limestone.

### BIRDS.

**Crossbills at Louth.**—Recently, flocks of Crossbills have been seen in the gardens on the east side of Louth. In the early morning of July 14th,\* a flock of about a dozen was seen by Mr. I. Robinson, Mount Pleasant, in his garden. He obtained two of the birds—both females—one young, the other adult. The next morning he saw a flock of more than a score, and obtained another young female; he again saw them in the afternoon of the same day. The taxidermist to whom they were taken saved one of the crops for me; its contents consisted entirely of 'Greenfly.' Two of the birds had the lower mandible curved to its left, the other to its right.—C. S. CARTER, Louth, July 17th.

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\* A few days later a fine female Crossbill was seen in a garden near Brough, E. Yorks.—EDS.

# SOME BRITISH EARTHMITES.

## *Trombididæ.*

C. F. GEORGE, M.R.C.S.

*Johnstoniana errans*.—This very remarkable mite was described by Dr. George Johnston in his 'Acarides of Berwickshire'\*. His description, which is accompanied by figures of the hairs of this mite on their bulbous base, one palpus, and two parts of the hind leg, is so clear and minute, that there can be no mistaking the identity of the creature. He describes it as blood red, with scarlet thorax legs and palpi; smooth to the naked eye. He points out that it is not a characteristic *Rhyncholophus*, but stands as it were between that genus and *Trombidium*. Now, dissection shews that it is nearer to *Trombidium* than to *Rhyncholophus*; for the great distinction between these two genera is, that in *Rhyncholophus* the mandibles are straight and fitted for piercing, whilst in *Trombidium* they are sickle shaped, and adapted for tearing. Figure B. is a mandible of this mite, and may be compared with that of *Trombidium holosericeum* (see page 333 of 'The Naturalist' for 1908, fig. i.).

In 'The Naturalist' for 1907, page 180, will also be found a figure of the mandibles of *Erythræus*, which is one of the *Rhyncholophidæ*, and shews distinctly the great difference between the mandibles of the two families.

At present *Trombidium* is divided into two sub-divisions, viz., *Trombidium* and *Ottonia*, and as the specimen now being described differs so greatly from both of them, I have ventured to make it a third sub-division, which I call *Johnstoniana*. It differs from the two other sub-divisions as follows:—

(a) The body is longer than broad, only very slightly wider at the shoulders, the sides are straight and almost parallel, and the posterior end is widely and regularly rounded.

(b) There is a distinct mark of division between the body and the cephalothorax; the latter is conical, and pointed in front.

(c) The eyes, each of which has two ocelli, are raised on short pedicles, and situated on the upper side of the cephalothorax, but wide apart.

(d) The palpi, one of which is drawn much enlarged (fig. c), besides the large claw at the end of the fourth joint, have two accessory small claws. *Trombidium* has no accessory claw, and *Ottonia* only one. These accessory claws are made out with difficulty, but can best be seen by examining the palpi before the mite is mounted.

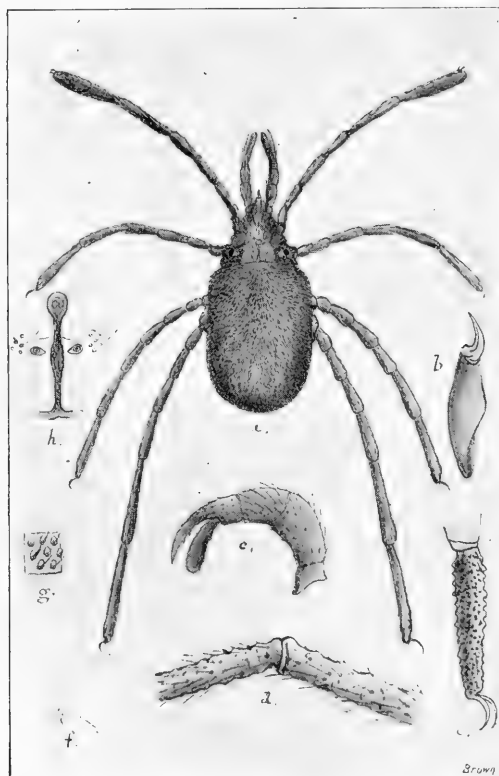
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\* 'The Berwickshire Naturalists' Club Transactions,' Vols. II. and III.

(e) The legs are altogether remarkably different from either of the other two sub-divisions. They are longer, and the hind legs are considerably longer than the others; and, instead of being more or less flattened from side to side, they are round, except where the claws are situated. They are studded with mamillary elevations irregularly situated, and having a stiff colourless curved bristle arising from their centres. Some of these are bent at right angles (figs. D, E and F); others only curved, but all point backwards. Perhaps they are best seen on the last joint of the hind leg (fig. E).

The front pair of legs are the next in length, and have the distal joint somewhat swollen, club-like. The sternite (fig. H) which is situated between the eyes, is rather short, and something like an inverted 'T,' ( $\perp$ ). It has on each side, about the middle of the stem, a rather large stigma, and on the skin above are a few stiff dark-coloured spines. The upper end of the

sternite is also enlarged, and has two stigmata within the enlargements. Considerable care is required to get a good mount of this organ. Mr. Evans has supplied me with three examples of this mite of different degrees of development. The last was an adult female, and contained several round and rather large red eggs. It was found in damp moss on a stone-faced fence on the road side near Edinburgh, on October 31st, 1908. There was a wood on one side, and open fields on the other. About 29 years ago I found two mites with similar legs, so that doubtless this mite is pretty widely distributed.



a. *Johnstoniana errans*.

b. Mandible.

c. Palpus.

d. Portion of hind leg.

e. Last joint of hind leg. [angles.

f. Hair on mamilla bent at right

g. Curved hairs on body.

h. Sternite.

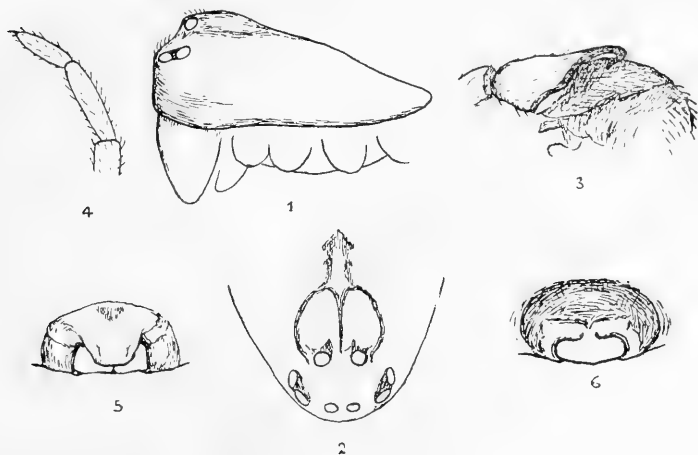


# NORTHUMBRIAN COAST SPIDERS.

Rev. J. E. HULL.

UNLESS otherwise noted, all the spiders enumerated below were collected by myself during a month's stay in the neighbourhood of North Sunderland, in September 1908. Since that time the kindness of two or three friends has enabled me to add a few names to the list, some of considerable importance. Previously, next to nothing had been done on the coast of Northumberland, for casual visits to the neighbourhood of Whitley Bay, by myself in 1896, and by Dr. Jackson a few years later, produced very meagre results. The most notable of the Whitley records was that of *Tmeticus reprobus* Cb. (then a little-known spider, and recorded by me as a new species under the name of *Tmeticus denticulatus*), and of *Erigone arctica* White, found there by Dr. Jackson in 1902, when it was new to the British list.

Of the more recent captures by far the most interesting is



1. *Cnephalocotes incurvatus* Cb. ♀ —cephalothorax.
2.       "       "       " —caput, from above.
3.       "       "       " —tibia of left palpus, from within.
4.       "       "       " —tarsus and metatarsus of first pair of legs.
5. *Lophocarenum nemorale* Bl. ♀ —epigyne.
6. *Lophocarenum parallelum* Bl. ♀ —epigyne.

*Cnephalocotes incurvatus* Cb., of which two males were taken on the links opposite the Farne Islands. The type specimen (also a male) was sent to Mr. Pickard-Cambridge from Aberdeen

1909 Aug: 1.

nearly forty years ago, and remained unique until the discovery of these Northumbrian examples. It was described in the Linnean Society's Transactions, vol. xxvii, 1873, under the name of *Walckenaëra incurvata*, and appears in Mr. Pickard Cambridge's 1900 list as *Tapinocyba incurvata*. Since 1900, however, the limits of the genera *Tapinocyba* and *Cnephalocotes* have been better defined, and the figures now given are sufficient to show that the present spider undoubtedly belongs to the latter. It appears to lie between *Cnephalocotes curtus* Sim. on the one hand, and *C. elegans* Cb. and *C. interjectus* Cb. on the other. The elevation of the hinder part of the caput is greater than in *C. curtus*, and less than in the other two, and the tibial process of the palpus is an exaggeration of that which is found in *C. interjectus*. In the structure of the palpal tarsus, it approaches very near to *C. curtus*. Viewed from above, the occipital elevation is pretty distinctly outlined by dusky lines which at first sight give the spider the appearance of a *Tapinocyba*, the lateral lines looking very much like the furrows which are found in the males of that genus. The female is as yet unknown, but now that a definite locality is known for the species, it ought to be forthcoming shortly.

*Lophocarenum nemorale* Bl. is now recorded for the second time for Northumberland. In 1871 it was taken by Dr. Hardy on Cheviot Hill, and quite recently I have found both sexes in Allendale on the moors at about 1400 feet. It was quite plentiful in tidal drift between Seahouses and Beadnell, and during the present year I have received it from similar situations in the neighbourhood of Cresswell. It would seem, therefore, to have a decided preference for maritime and sub-alpine localities, though by no means unknown elsewhere. So far as I know, this is the best authenticated example among spiders of a peculiarity of distribution which is well known in other branches of natural history.

*Prosthesima nigrita* Th., so far as Northumberland is concerned, has a similar distribution, as the only previous record was for Cheviot.

*Erigone arctica* White, and *E. longipalpis* Sund. are now known to abound all along the north-east coast. They literally swarmed in the tidal drift, the former being the more abundant of the two. Both of them also occurred casually on the sand-hills. These two species seem to be essentially maritime.

*Lophocarenum parallelum* Bl. was equally plentiful with

*L. nemorale* Bl. at the same time and place ; but, unlike that species, it does not appear to ascend into the hills. Its upward limit in Allendale seems to be about 700 feet.

Two other rare spiders have since been sent to me from the tidal drift—*Typhochraestus digitatus* Cb., a fine pair from the same spot as the spiders noted above (October 1908), the second occurrence of the female in the county, and the first of the male ; *Cnephalocotes elegans*, both sexes (May 1909—just through the last moult) from Cresswell, the second record of the male for Northumberland and the first of the female.

The characteristic spiders of the sandhills (as distinguished from the comparatively level links on the landward side of them) are *Clubiona phragmitis* C.L.K., *Tibellus oblongus* Wlk., and *Trochosa picta* Hahn. Along with these are swarms of *Leptyphantes tenuis* Bl., *L. blackwallii* Kulcz., and *Meta segmentata* Clk., which, though they may be found almost anywhere, are particularly abundant among the marram grass.

Very few of the spiders occurring on the links have any claim to be considered distinctively littoral, but several species appear to flourish better there than elsewhere. Among these may be mentioned *Oonops pulcher*, *Pholcomma gibbum*, *Bolyphantes luteolus*, *Gongylidium apicatum*, *Neriere bituberculata*, *Tiso vagans* and *Aræoncus humilis*.

The two species of *Erigone* and *Tmeticus reprobus* Cb. are the only spiders which are exclusively maritime. The former occasionally wander to some little distance inland, but *T. reprobus* seems to be confined to the immediate neighbourhood of high water mark, where it is to be found under loose stones. It is generally distributed around the British Isles, but not yet recorded for the mainland of Europe.

The following is a list of all the species—sixty-one in number :—

*Oonops pulcher* Templ.  
*Drassus lapidosus* Walck.  
*D. troglodytes* C.L.K.  
*Prothesima nigrita* Sund.  
*Micaria pulicaria* Sund.  
*Clubiona reclusa* Cb.  
*C. phragmitis* C.L.K.  
*C. diversa* Cb.  
*C. trivialis* L. K.  
*Agræa proxima* Cb.  
*Amaurobius fenestralis* Str.  
*Textrix denticulata* Oliv.  
*Theridion bimaculatum* L.

*Pholcomma gibbum* Westr.  
*Phyllonethis lineata* L.  
*Robertus lividus* Bl.  
*Tapinopa longidens* Wid.  
*Bolyphantes luteolus* Bl.  
*Stemonyphantes lineatus* L.  
*Linyphia clathrata* Sund.  
*L. montana* Clerck.  
*L. hortensis* Sund.  
*Leptyphantes blackwallii* Kulcz.  
*L. tenuis* Bl.  
*L. ericæus* Bl.  
*Bathyphantes variegatus* Bl.

*Pedina scopigera* Grube.  
*Centromerus bicolor* Bl.  
*C. silvaticus* Bl.  
*Tmeticus reprobis* Cb.  
*Microneta beata* Cb.  
*Gongylidium fuscum* Bl.  
*G. apicatum* Bl.  
*G. retusum* Westr.  
*Erigone arctica* White.  
*E. longipalpis* Sund.  
*Tiso vagans* Bl.  
*Typhochræstus digitatus* Cb.  
*Lophomma herbigradum* Bl.  
*Dicymbium nigrum* Bl.  
*Nerine bituberculata* Wid.  
*Gonatum rubens* Bl.  
*G. rubellum* Bl.  
*Savignia frontata* Bl.  
*Aræoncus humilis* Bl.  
*Cnephalocotes incurvatus* Cb.  
*C. elegans* Cb.

*Lophocarenum nemorale* Bl.  
*L. parallelum* Bl.  
*Wideria antica* Wid.  
*Walckenaëra acuminata* Bl.  
*Cornicularia unicornis* Cb.  
*Ceratinella brevis* Wid.  
*Ero furcata* Vill.  
*Meta segmentata* Clerck.  
*M. merianæ* Scop.  
*Pachygnatha degeerii* Sund.  
*Xysticus cristatus* Clerck.  
*Oxyptila trux* Bl.  
*Tibellus oblongus* Walck.  
*Trochosa terricola* Thor.  
*T. picta* Hahn.  
*Tarentula pulverulenta* Clerck.  
*Lycosa amentata* Clerck.  
*L. pullata* Clerck.  
*L. nigriceps* Thor.  
*Heliophanus flavipes* Clerck.

My thanks are due to Mrs. Fletcher, North Sunderland Vicarage; to Mr. Tait, North Sunderland; and to Mr. W. Flowers, West Thirston, for spiders collected and kindly sent on to me. Also to the Rev. O. Pickard-Cambridge, for kindly confirming my identification of some of the rarer species.

Figures of *Cnephalocotes incurvatus* are here given to supplement those of Mr. Pickard-Cambridge in the Linnæan Society's Transactions, volume xxviii., plate 46, fig. 20; also of *Lophocarenum nemorale* ♀ and *L. parallelum* ♀, which are not figured in any British work, and only very imperfectly in Chyzer and Kulczynski's 'Araneæ Hungariæ.'

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**A Short Guide to the Museum of Practical Geology, Jermyn Street, London, S.W.** 48 pp. Price 1d.

Some little time ago when visiting the Jermyn Street Museum, we purchased an elaborate guide for 6d., and were much impressed with the detailed accounts of large collections, which had been removed to other museums, some miles away. This state of things has now been remedied, and we are delighted to find that the Jermyn Street Museum has brought out a carefully compiled guide at the popular price of one penny. A perusal of this is some slight indication of the wealth of the geological specimens in this institution. By the aid of this 'short guide' the visitor can at once find his way to the objects he is particularly interested in. Further help in this direction is given by the insertion of five plans.

**An Official Guide to Towneley Hall, Burnley**, written by Mr. John Allen, has just been issued by the Burnley Museum Sub-Committee. It is a well-illustrated account of this ancient mansion, now an attractive Art Gallery and Museum. Quite apart from its associations, there is much in Towneley Hall of interest to the artist, antiquary, or naturalist. In view of the extreme value of the Foldy's Cross, and the fact that it is one of the few of this type that are dated (1520), we certainly think that it should be placed under cover.

# THE PHYTOPLANKTON OF THE ENGLISH LAKE DISTRICT.

WM. WEST, F.L.S.,

AND

G. S. WEST, M.A., D.Sc., F.L.S.

(Continued from page 267).

6. MICRASTERIAS MAHABULESHWARENSIS Hobson var. WALLICHII (Grun.) W. & G. S. West, l. c. p. 122, t. 54, f. 7, 8; t. 55, f. 1-3. *M. Wallichii* Grun.

This interesting Desmid occurred in the plankton of Grasmere. In the British Islands it was only previously known from the plankton of certain of the lochs of Scotland and the Shetland Islands, in which places it has recently been discovered. Long. 197  $\mu$ ; lat. 150-165  $\mu$ ; lat. isthm. 32  $\mu$ .

7. COSMARIUM CONTROVERSUM West in 'Journ. Roy. Micr. Soc.', 1890, p. 289, t. 6, f. 31 [both description and figure imperfect].

This rare species has previously been recorded from both Wales and Scotland. It occurred in the plankton of Grasmere, but was very rare. The following is an amended description of the species:—

*C. submagnum*,  $1\frac{1}{5}$ - $1\frac{1}{4}$ -plo longius quam latum, profunde constrictum, sinu angusto-lineari extremo ampliato; semicellulæ pyramidato-trapeziformes, angulis basalibus rotundatis, lateribus leviter convexis, angulis superioribus rotundatis, apice late truncato; a latere visæ ovato-ellipticæ; a vertice visæ ellipticæ, tumore parvo ad medium utrobique. Membrana granulata, granulis rotundatis et uniformibus, in series obliquis decussatis 14 et series verticalibus indistinctis 18-19 (nonnunquam vix conspicuis), ad marginem semicellularum uniuscujusque granulis 30-35 visis, in centro semicellularum cum scrobiculis rotundatis conspicuis inter granulos. Pyrenoidibus binis.

Long. 90-96  $\mu$ ; lat. 72-77  $\mu$ ; lat. isthm. 22-32  $\mu$ ; crass. 45  $\mu$ .

8. ARTHRODESMUS TRIANGULARIS Lagerh. var. SUBTRIANGULARIS (Borge) W. & G. S. West in 'Trans. Bot. Soc. Edin.', XXIII., 1905, p. 24. *A. Incus* var. *subtriangularis* Borge in 'Botaniska Notiser,' 1897, p. 212, t. 3, f. 4. *A. triangularis* var. *hebridarum* W. & G. S. West, 'Journ. Linn. Soc.', XXXV 1903, p. 542.

This characteristic plankton-variety of *A. triangularis* occurred in several of the lakes, but not in any great profusion. Long. 35–42  $\mu$ ; lat. sine spin. 25–32  $\mu$ , cum spin. 77–83  $\mu$ .

A most interesting form with a triangular vertical view occurred in the plankton of Easedale Tarn. This constitutes one of the connecting forms between the genera *Arthrodesmus* and *Staurastrum*. It was observed intermingled with the more usual elliptical variety, and might be called 'forma triquetra' (Fig. 5D).

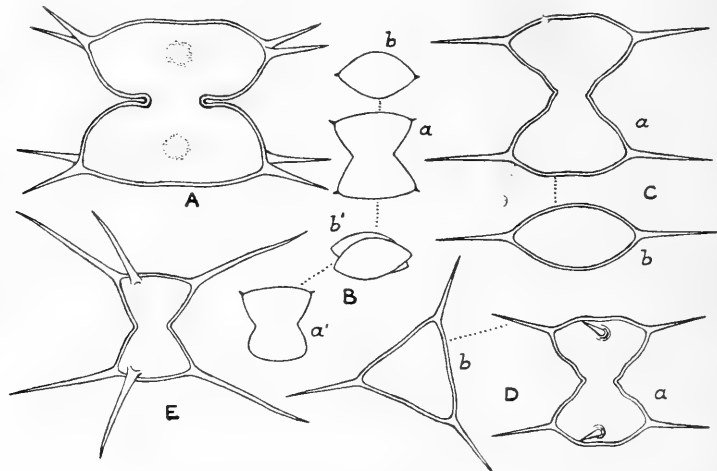


FIG. 5. A., *Xanthidium subhastiferum* West var. *Murrayi* W. & G. S. West,  $\times 430$ ; B., *Arthrodesmus crassus* W. & G. S. West,  $\times 500$ ; C., *A. triangularis* Lagerh. var. *subtriangularis* (Borge) W. & G. S. West,  $\times 500$ ; D., *A. triangularis* var. *subtriangularis* forma *triquetra*,  $\times 500$ ; E., *Staurastrum jaculiferum* West,  $\times 500$ .

9. *ARTHRODESMUS CRASSUS* W. & G. S. West in 'Journ. Linn. Soc.', XXXV., Nov. 1903, p. 541, t. 14, f. 8, 9. *Staurastrum Sarsii* Huitfeldt-Kaas, Planktonundersögelser, I., Norske Vande, Christiania, 1906, pp. 55, 156, t. 1, f. 11–17.

This species occurred in great abundance in Ennerdale Water. Long. 19.5–23  $\mu$ ; lat. (sine spin.) 19–21  $\mu$ ; lat. isthm. 10  $\mu$ ; crass. 11.5–13  $\mu$ . (Fig. 5 B). It appears to be a true plankton form in the British lake-areas. Huitfeldt-Kaas, who found the same Desmid in the Norwegian lakes, made the mistake of regarding the fibrillar structure of the enveloping mucus as an armature of spines.

10. *XANTHIDIUM SUBHASTIFERUM* West var. *MURRAYI* W. & G. S. West, l. c. 1903, p. 540, t. 16, f. 6.

This distinctive variety has only previously been observed from the Scottish lakes. It was abundant in Grasmere and Windermere, especially in the latter, in which it was quite a conspicuous feature of the plankton. It also occurred in Hawes Water. Long. 56–61  $\mu$ ; lat. sine spin. 56–62  $\mu$ , cum spin. 92–97  $\mu$ . (Fig. 5 A).

II. STAUSTRUM ANATINUM Cooke & Wills var. LAGERHEIMII (Schmidle) nob. *St. Lagerheimii* Schmidle in Bih, till K. Sv. Vet.-Akad. Handl. Bd. 21, No. 8, 1898, t. 3, f. 10. *St. Landmarki* Huitfeldt-Kaas, l. c. 1906, pp. 54, 155, t. 2, f. 32, 33.

This variety differs only from typical *St. anatinum* in the shorter processes, which are scarcely more than half the normal length. It occurred in Ennerdale Water and in Easedale Tarn. Long. 53–65  $\mu$ ; lat. cum proc. 72–88  $\mu$ . *St. anatinum* and several of its varieties occur abundantly in the British lake-plankton. The var. *Lagerheimii* is known from Norway and Northern Sweden (Finmark).

12. STAUSTRUM ARCTISCON (Ehrenb.) Lund. in Nov. Act. R. Soc. Scient. Upsala, ser. 3, VIII., 1871, p. 70, t. 4, f. 8.

This handsome Desmid appears to be very general in the British plankton, although exceedingly rare in other situations. It was particularly abundant in Brothers' Water.

13. STAUSTRUM CUSPIDATUM Bréb. var. MAXIMUM West in 'Naturalist,' Aug. 1891, p. 247; W. & G. S. West in 'Journ. Linn. Soc. Bot., XXXV., 1903, p. 545, t. 17, f. 13. *St. cuspidatum* Bréb. var. *longispinum* Lemm. in 'Botan. Centralbl. Bd.', LXXVI., 1898, p. 4 (sep.). *St. Daaei* Huitfeldt-Kaas, l. c. 1906, pp. 55, 155, t. 2, f. 30, 31.

In the plankton of all the British lake-areas this large variety of *St. cuspidatum* occurs in abundance. It exhibits considerable variability in the length of the spines, although they are invariably stronger than in typical *St. cuspidatum*. Surrounding the base of each large spine is a ring of about six large pores, through each of which a short projecting piece of denser mucilage can frequently be seen extending into the surrounding and less dense gelatinous envelope. These structures are sometimes very conspicuous, and have caused Huitfeldt-Kaas to describe them as spines.

14. STAUSTRUM JACULIFERUM West in 'Journ. Linn.

Soc. Bot.', XXIX., 1892, p. 172, t. 22, f. 13; *ibid.* XXXV., 1903, p. 543, t. 17, f. 1-4.

This species is fairly general in the plankton of the English lakes, and a particularly fine form is abundant in Wastwater (Fig. 5 E). This form attained a diameter of 80  $\mu$  with the spines.

15. *STAUSTRUM BREVISPINUM* Bréb. forma MAJOR. Cells very large, but otherwise typical. Long. 59-63  $\mu$ ; lat. 52-57  $\mu$ . This form was abundant in the plankton of Brothers' Water (Fig. 6 E). In size it approaches var. *altum* W. & G. S. West, but has not the proportions characteristic of that variety.

16. *STAUSTRUM OPHIURA* Lund. in Nov. Act. R. Soc. Scient. Upsala, ser. 3, VIII., 1871, No. 2, p. 69, t. 4, f. 7.

This species was only observed in the plankton of Easedale Tarn. It has been seen in no other part of the Lake District, and this is its first record for England. This is the more remarkable since *St. Ophiura* is one of the most conspicuous constituents of the Scottish and Welsh plankton. The specimens observed were 9-rayed, and had a diameter (with processes) of 142  $\mu$ .

17. *SPHÆROZOSMA VERTEBRATUM* Ralfs var. *PUNCTULATUM* W. & G. S. West in 'Trans. Bot. Soc. Edin.', XXIII., 1905, p. 28. *S. punctulatum* West in 'Journ. Bot.', Dec. 1891, t. 315, f. 1, 2.

This variety occurred in both Brothers' Water and Ennerdale Water, but was much more abundant in the latter. The cells are more angular than those of the type-form, and the punctulation of the cell-wall is a marked feature of the variety.

18. *EUDORINA ELEGANS* Ehrenb.

We find this member of the Volvocaceæ fairly general in the plankton of British pools and lakes. It always attains its greatest maximum in the autumn, during the decline of temperature.

Huitfeldt-Kaas (l. c. 1906, p. 36) has placed *Sphærocystis Schroeteri* in the Volvocaceæ under the name of '*Glæococcus mucosus* A. Br.', but we are inclined to think that he has confused this characteristic plankton-alga with *Eudorina elegans*. Wesenberg-Lund also believes this confusion to have taken place. We should not be surprised if Huitfeldt-Kaas had done this,



as some of his other observations point to similar misconceptions. He describes the fibrillar structure of the mucous envelope of certain Desmids as 'spines.'

We would point out that the cells of the *Eudorina*-colony are arranged more closely, and much more regularly than those of *Sphaerocystis*, and that each cell frequently contains several pyrenoids. Moreover, the bases of the cilia, where they pass through the mucous envelope, can always be seen in *Eudorina*, even in badly preserved specimens.

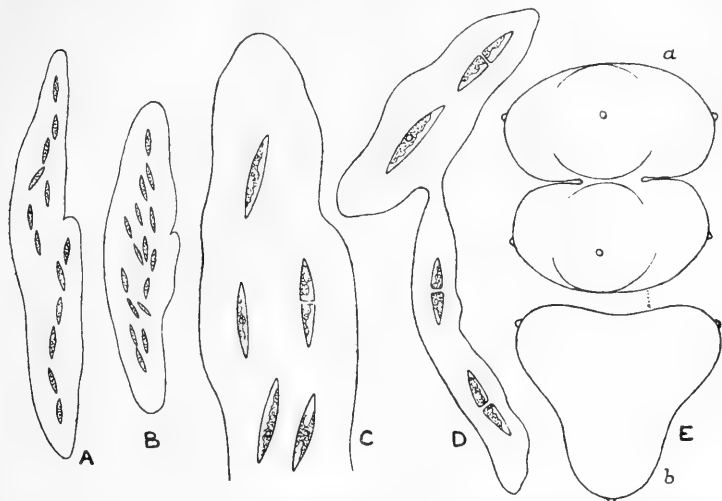


FIG. 6. A.-D., *Elakatothrix gelatinosa* Wille from the plankton of Wastwater. A. and B., Colonies,  $\times 200$ ; C., portion of colony,  $\times 500$ ; D., very small colony,  $\times 500$ . E., *Staurastrum brevispinum* Bréb. forma major from the plankton of Brothers' Water,  $\times 500$ .

19. ELAKATOTHRIX GELATINOSA Wille in 'Biol. Centralbl.', XVIII., 1898.

This interesting Alga has only previously been observed in the lakes of Norway. It is not uncommon in the plankton of Wastwater, more especially in August, September, and October, but the British specimens do not exactly agree with those described from Norway. The cells are slightly narrower, and their disposition within the enveloping mucus is often somewhat irregular, although their long axes are arranged more or less lengthwise in the colony. The exterior of the mucous investment is very firm and tough, and the colonies have the general form of a somewhat irregular spindle. Long.

cell.  $16-25\ \mu$ ; lat. cell.  $3-4\ \mu$ ; long. colon.  $130-340\ \mu$ ; lat. colon.  $13-48\ \mu$ . (Fig. 6 A-D.)

Wille has also described an American species—*Elakatothrix americana*—with shorter and broader cells (*vide* 'Wille in Rhodora,' Aug. 1899, p. 150).

#### BACILLARIÆ.

20. RHIZOLENIA MORSA W. & G. S. West in 'Trans. Roy. Irish Acad., XXXIII., sect. B., part II., 1906, p. 109, t. II, f. 5—7. *R. eriensis* H. L. Smith var *morsa* W. & G. S. West in 'Trans. Roy. Soc. Edin., XLI., part III., 1905, p. 509, t. 6, f. 23.

This Diatom occurred in abundance in Thirlmere and Windermere. It is now known to occur in all the British lake-areas, and also in the Australian plankton. In the June plankton of Thirlmere resting-spores were noticed. These were relatively small, and were formed towards the middle of the cell. They were broader than long, and furnished with strong walls. Long. spor.  $9\ \mu$ ; lat.  $12\ \mu$ . (Fig. 2).

21. TABELLARIA FENESTRATA (Lyngb.) Kütz. var. ASTERIONELLOIDES Grun.

This plankton-variety is fairly general in the English lakes and the elongated form of the frustules is maintained much more constantly than in the Scottish lakes. In the plankton of Grasmere colonies with very long frustules were plentiful. Long. frust.  $86\ \mu$ ; diam. colon.  $170\ \mu$ .

The first British record of this variety was in 1902, when we recorded it from Lough Neagh and Lough Beg, but since then it has been found abundantly in all the lake-areas.

#### MYXOPHYCÆ.

22. LYNGBYA BIPUNCTATA Lemm. in 'Forschungsab. Biol. Stat. Plön., VI., 1900, p. 138, t. 2, f. 48; *ibid.* X., 1903, p. 152.

This species was frequent in both Codale and Easedale Tarns. Diam. trich.  $1.4\ \mu$ ; long. cell,  $4-5.5\ \mu$ . Close to each end of every cell is a strongly refractive granule, the rest of the cell-contents being homogeneous, and of a pale blue-green colour. The filaments were flexuose, but not twisted into any regular spirals, as is sometimes the case. It appears to be very closely allied if not identical with *L. Lagerheimii* (Möb.) Gomont. The narrow plankton-species of *Lyngbya* require further investigation and considerable revision.

(To be continued).



Fig. 1.



Fig. 2.



Fig. 3.

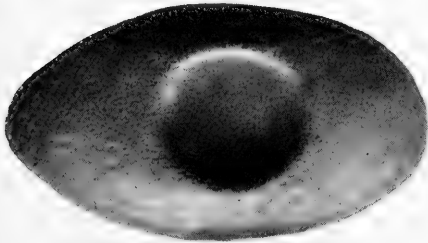


Fig. 4.

Stone Hammer-Heads found in East Yorkshire.



# SOME NEOLITHIC HAMMER-HEADS FROM E. YORKS.

T. SHEPPARD, F.G.S., F.S.A.Scot.

(PLATE XVI.)

THE archæological section of the Hull Museum has recently been enriched by a number of interesting objects. Amongst these are some hammer-heads of more than usual value, from the careful way in which they have been constructed, and also from the fact that they are of somewhat uncommon types. In each case the entire surface of the stone has been carefully worked, in order to give the shape to the implement, though in one instance, namely the Bampton specimen (fig. 2), it is quite possible that a well-rounded beach pebble may have been selected, the implement being shaped from it with less trouble than would have been the case from a rough piece of stone.

Perhaps the neatest weapon is that shown in fig. 3, which was found at Sproatley in Holderness. This is made from a highly crystalline fine-grained igneous rock, probably obtained from the local drift, and is very symmetrically shaped. In proportion to the weapon, the hole for the haft is large. It seems to be rather different in type from any figured by the late Sir John Evans in his 'Ancient Stone Implements of Great Britain.' The weapon is roughly egg-shaped, the sides and ends being convex, whilst the top and bottom are slightly concave. It is 3 inches in length,  $2\frac{3}{4}$  inches in width,  $1\frac{1}{8}$  inch in thickness, and the hole is an inch in diameter at the outsides, being slightly less in the centre. It weighs  $7\frac{1}{2}$  ounces.

A somewhat similar type of weapon is that shown in fig. 4, though the top and bottom are convex, and the extremities are rather more pointed than in the Sproatley example. It was found in the Carrs at Burton Agnes in 1890 by a game-keeper, and was presented to our collection by the Rev. C. V. Collier, F.S.A. The stone is of a hard quartzite or altered sandstone, such as occurs in the local drift, but the chief interest in the weapon is the fact that it is in an unfinished state. The sides have not been rounded off as in the Sproatley example, and although an attempt has been made to bore a hole for the shaft from each side, the work has not been completed, there being less than one-eighth of an inch still to cut through. It well illustrates the probable method of boring the hole, viz., by means of sand and a stick, the scratches round and round being distinctly visible. The length of the implement is

$3\frac{1}{2}$  inches ; it is 2 inches wide, and  $1\frac{3}{8}$  inches deep. The hole for the handle is  $1\frac{1}{8}$  inch across on each side. It weighs 9 oz.

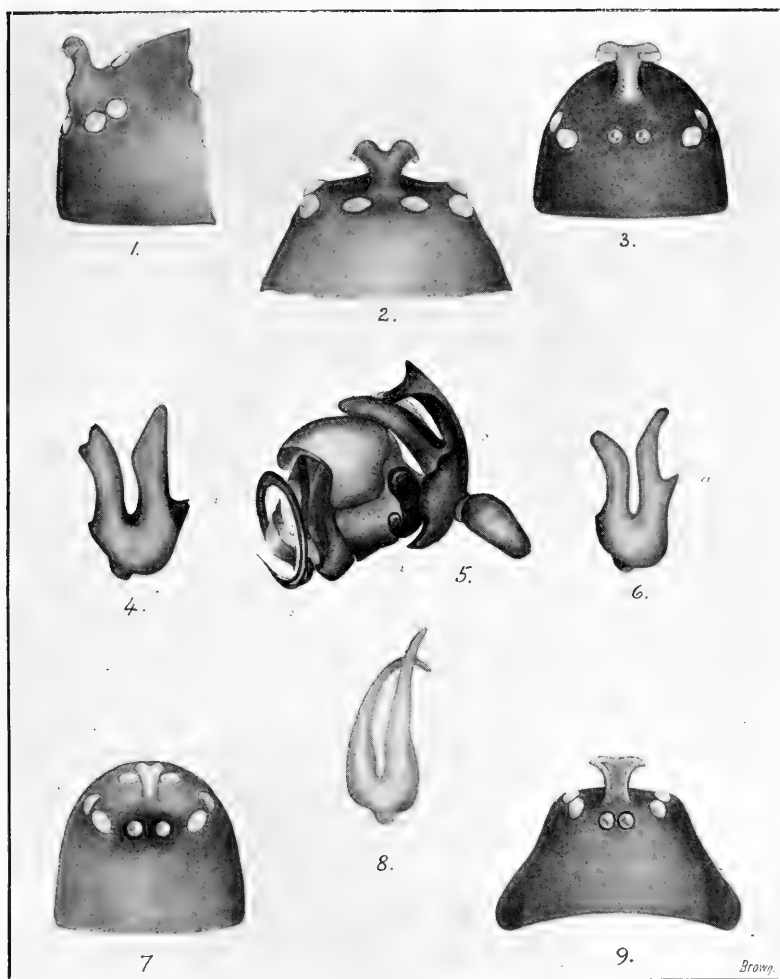
A hammer-head of somewhat unusual type is illustrated in fig. 2. This was recently found at Bempton, and the aperture for the haft is remarkably well drilled, being perfectly circular, and well polished inside. Its shape can best be ascertained from the photograph. The material is a very hard quartzite, probably a beach boulder. It is  $2\frac{1}{4}$  inches long,  $1\frac{1}{4}$  inch wide at the widest part,  $1\frac{1}{2}$  inch in thickness, the hole for the handle being  $\frac{7}{10}$ ths of an inch across, slightly narrowing towards the centre. It weighs 7 oz.

Perhaps the most remarkable of the series, however, is the specimen shewn in fig. 1, which was found at Hotham. It is made of polished flint. The specimen is interesting, as it has not been perforated in the ordinary way by boring, the nature of the material of course making such a feat well-nigh impossible. What has happened is that the early hammer-maker has selected a large slab of flint, which has had a natural hole or flaw through it, and the hammer-head has been worked round the hole. It is 3 inches long,  $2\frac{1}{4}$  inches wide, 2 inches deep, and weighs  $9\frac{1}{2}$  ounces. The only other perforated hammer of this material of which I have any knowledge is also an East Yorkshire specimen, in the collection of Mr. Thomas Boynton, F.S.A. It is not of Yorkshire flint, but is made from one of the tougher travelled flints such as occur in the glacial clay of East Yorkshire.

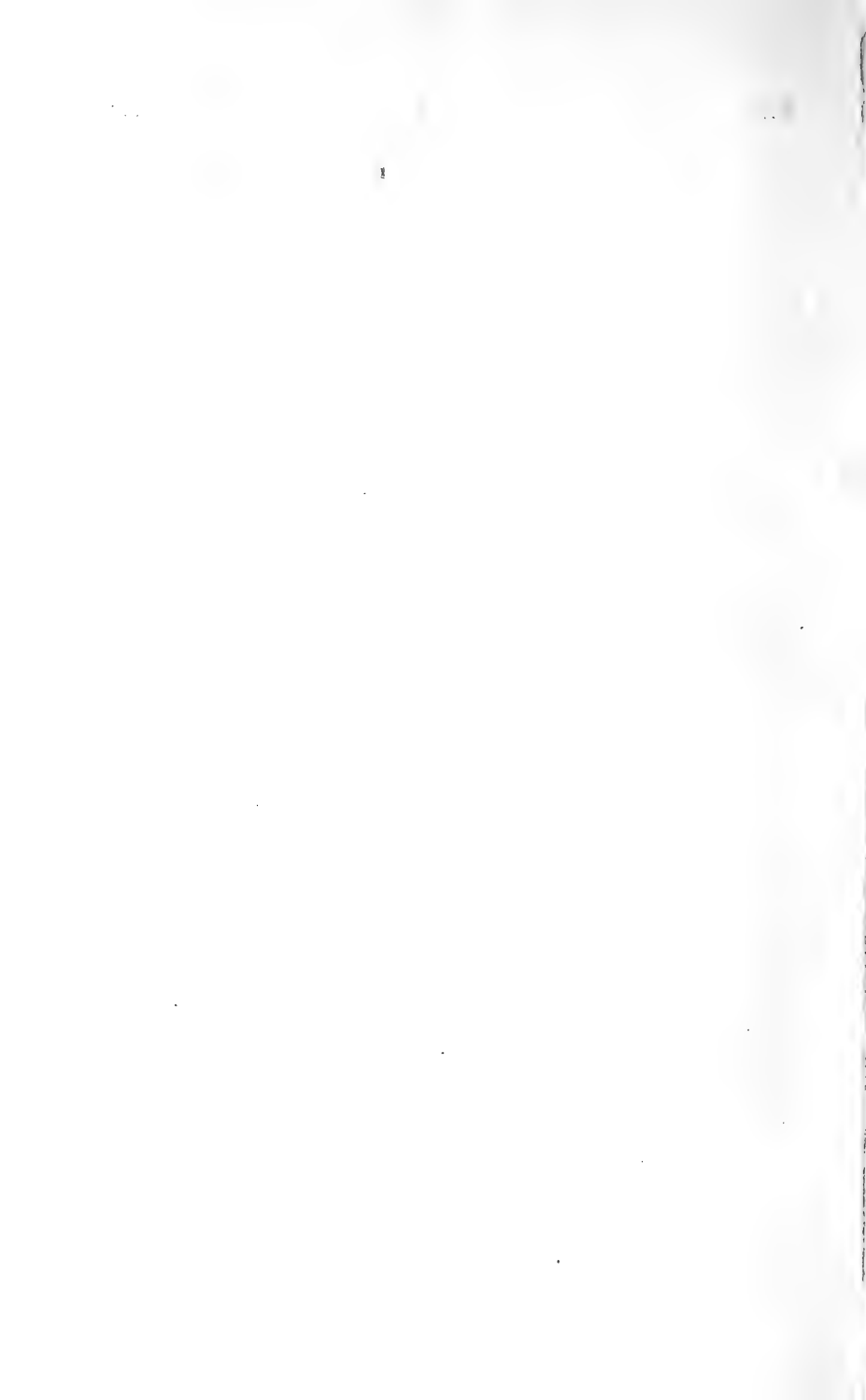
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**Quick Nest-Building by Blackbirds.**—In preparation for the camp of the East Lancashire Royal Engineers at Ben Rhydding, a quantity of timber (for fuel, etc.) was carted from the railway station on to the camp-field, on Thursday, May 27th. Short of two days later, on Saturday morning, May 29th, this pile contained a Blackbird's nest, with one egg in it. This pair of birds would probably have to build another hurried nest, as the wood was quickly put into use with the arrival of the regiment on the latter date.—H. B. BOOTH, Ben Rhydding.

As a supplement to Mr. Booth's note, I may mention the case of a Mistle Thrush, which came under my notice several years ago. A nest of this species was to be found regularly year after year in a forked branch of a certain tree. Visiting the tree one Sunday, there was not the slightest signs of a nest, On the following Saturday the usual place contained a nest and four eggs.—R. FORTUNE.



*Cornicularia kochii*, Camb.





# **CORNICULARIA KOCHII CAMB.—A SPIDER NEW TO GREAT BRITAIN.**

**WITH A KEY TO THE BRITISH CORNICULARIÆ.**

WM. FALCONER,  
Linthwaite, Huddersfield.

(PLATE XVII.).

IN a paper entitled 'On some Rare Arachnids obtained in 1908,' and issued in the 'Transactions of the Natural History Society of Northumberland, Durham and Newcastle-upon-Tyne,' New Series, Vol. III., part 2, 1909, Dr. A. Randell Jackson describes and figures a new spider under the name of *Cornicularia valida*, founded on a solitary female, which he took from amongst fallen leaves under a thorn bush on the banks of the Dee, at Saltney Ferry in Cheshire. Through the kindness of its discoverer, I have been able to compare this female with others which lately came into my possession, and which were collected in April of the present year by Mr. T. Stainforth of the Hull Museum, on the North Lincolnshire coast, and sent to me for identification. Included also in the collection were a couple of males, which are undoubtedly of the same species. On examination, the latter were determined to be examples of the *C. kochii* Camb., described and figured in the 'Proceedings of the Zoological Society,' 1872. Mr. F. P. Smith, of London, was of the same opinion, and the Rev. O. Pickard-Cambridge, on a male being submitted to him, confirmed the identification, though he doubts its identity with the spiders so named both by Kulczynski in his 'Araneæ Hungariæ,' and by Simon in his 'Les Arachnides de France' and 'Histoire Naturelle de Araignées.' *C. valida* Jackson is therefore the hitherto unrecognised female of *C. kochii* Camb., (the name becomes a synonym), while the male of the latter is here for the first time recorded as an inhabitant of these islands.

The Corniculariæ are small spiders, ranging in size between two and three mm., usually with black bodies and reddish or yellowish legs, and may be met with amongst the moss, fallen leaves and herbage of woods and marshes. They are members of the group Erigoneæ, and belong to that section of it, which is characterised by an elongated oval cephalothorax, a sternum longer than wide; and in the female sex by a palpus which has the tibia much longer than the patella, and more or less enlarged from base to summit, and the tarsus strongly acuminate. From the other genera comprised in the same section, they may

be thus distinguished. In *Wideria* Sim. the posterior row of eyes, instead of being straight or nearly so, is curved strongly backwards. In *Walckenaera* Bl. the front is wider and the eyes occupy only a portion and not the whole of its width. In *Prosopotheca* Sim. the posterior eyes are much larger and closer. In *Tigellinus* Sim. the tarsi of the first pair of legs, instead of being about the same length as, are much shorter than, the metatarsi; while the tibial spines are also longer and stouter.

Eight species of *Corniculariæ* have now been recognised in the British Isles. Two only of these, *C. cuspidata* Bl. and *C. unicornis* Camb., can be considered at all common; the rest are amongst our rarest spiders. Of *C. pavitans* and *C. pudens* Camb., the solitary type females from the Cheviots, 1871, and of *C. lucida* Camb., two males from Dorset, 1870 and 1900, alone exist, while *C. karpinskii* Camb. has been taken twice—in Lanarkshire and Cumberland, 1900. The males of four species—*C. cuspidata* Bl., *C. unicornis*, *C. karpinskii* and *C. kochii* Camb., are provided with a very distinct tubercle springing from the centre of the ocular area. In two species, *C. vigilax* Bl. and *C. lucida* Camb., there is no such process.

Apart from minor differences, the presence or absence and the form and size of this tubercle, will, therefore, together with the structure of the palpus, especially of the tibial joint and of the palpal organs, most readily distinguish the males of the genus from each other; while the formation of the vulva, and the position and size of the eyes will render the same service in the case of the females.

Fam.—ARGIOPIDÆ.

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Sub-fam.—LINYPHIINÆ.

Group—ERIGONÆ.

Section—WALCKENAERINI.

### CORNICULARIA KOCHII Camb.

Length of male, 2·6 mm.

The cephalothorax of this spider is a very dark brown, devoid of punctate impressions, but somewhat rugulose behind at the sides and back. The abdomen is black and clothed with short hairs. The falces and mouth parts are a lighter dark brown, and the joints of the palpus, except the digital joint, which is a little darkened, are pale yellow. None of the above parts present any exceptional feature.

OCULAR TUBERCLE. This process (figs. 1, 2 and 3) in this

spider is most characteristic. It is not only of a different shape and much larger and stronger than in the other species, being quite discernible in spirit with the unaided sight, but is also deeply divided at its extremity into two distinct, divergent lobes, which are convex above, concave beneath, and curved slightly downwards, with their edges ciliate with short, stiff, straight, equal, pale-coloured hairs. The under surface of the column is furnished towards the base with a number of longish, stiff, irregular, spreading hairs.

In *C. cuspidata* Bl., the tubercle is simple and obtuse ; in *C. unicornis* (fig. 7) and *C. karpinskii* Camb. (fig. 9), besides being much smaller, it is only indistinctly bilobed at the apex.

PALPUS. THE TIBIAL JOINT is prolonged above in a very large, long, irregular, curved apophysis, which is divided almost to the base into two narrowly separated (latterly a little divergent) portions, slightly unequal in length and directed forward. The inner and longer limb, somewhat bent in the terminal part, lies close to the digital joint, and is narrowed and slightly sinuous towards the apex. Near the base on its outer margin, it bears a strong tooth. The outer limb is further removed from the digital joint, is abruptly acuminate at the apex, and supplied a little below that point with a stout, obtuse, oblong branch directed downwards and outwards. The other males do not possess the last-named process.

In *C. unicornis* Camb. (fig. 6) and *C. karpinskii* Camb. (fig. 8) the tibial apophysis is likewise divided almost to the base. In the former, however, the limbs diverge, and the inner one bears a tooth ; in the latter, the limbs converge, and the inner one is without a tooth. In *C. cuspidata* Bl. the apophysis is undivided.

THE PALPAL ORGANS are bulky, complex, and prominent, the most noticeable features being (1) on the outer side at the base, a stout dark brown C-curved process (fig. 5a) ; (2) at the extremity, obliquely inclined outwards, a long, black, circular, spine (fig. 5b) ; (3) on the inner side, springing directly from beneath the apical spine, a long, strong, curved, red-brown tooth directed backwards towards the base of the palpal organs.

EYES. Eight in number, rather small, the fore centrals being decidedly the smallest ; arranged in two rows, which are curved away from each other, enclosing an oval space. The curve of the posterior row is very slight, that of the anterior row is stronger. Both the hind and fore centrals are much closer

to each other than to the laterals of the same row. The latter pair are almost contiguous, being less than half their diameter apart. The former are more separated, being fully a diameter apart. The quadrilateral which they form is much longer than wide, and narrower in front than behind.

The male from which the above description and the drawings were taken, together with most of the females, is now in the Hull Museum, and may be seen there by anyone interested in the matter.

*C. kochii* Camb. has now occurred in close proximity to the sea in three English counties:—in Cheshire, one female, 1908 (Dr. Jackson); in Yorkshire, at Saltend Common, near Hull, where other very rare and unexpected spiders have occurred, one female, May 1909 (T. Stainforth); and in Lincolnshire, first on the occasion of the Hull Scientific and Field Naturalists' Club Excursion, 17th April, 1909, two males, four females on the coast between South Ferriby and Barton-upon-Humber (T. Stainforth); later, in May, two females (T. Stainforth), and three females (E. A. Parsons) in the same place, one female between Barrow Haven and Barton Haven (T. Stainforth), and one female between Barrow Haven and New Holland (T. Stainforth).

I am informed by Mr. Stainforth that the localities on both sides of the Humber are similar in character—the flat portion of land covered with the usual estuarine plants (sea aster, sea pink, maritime plantain, etc.), which lies between the barren mud flats of the river and the clay embankments, and is submerged only at the highest tides. The specimens were found on the dried mud beneath or amongst the coarse matted grasses and the estuarine plants.

## TABLE OF THE BRITISH CORNICULARIÆ.

### MALES.

A.—Ocular area with a vertical tubercle.

I. Tubercle obtuse and simple. Tibial apophysis undivided .. .. .CUSPIDATA Bl.

II. Tubercle bilobed at apex. Tibial apophysis divided almost to base.

1. Tubercle very large, deeply divided at apex into two distinct divergent lobes. Outer limb of tibial apophysis with an oblong branch near its extremity KOCHII Camb.

2. Tubercle small, indistinctly bilobed at apex. Outer limb of tibial apophysis without a branch.

(a) Limbs of apophysis diverge. Inner limb with a tooth near its base. .. .. .UNICORNIS Camb.

(To be continued).

Naturalist.

## YORKSHIRE NATURALISTS AT BOWLAND.

IN their peregrinations the members of the Yorkshire Naturalists' Union during the past half-century have visited many parts of the county, but rarely have they got so far from the madding crowd as during Whit week-end, when the district around Bowland, or Bolland, was investigated. Newton-in-Bowland was decided upon as the headquarters, and its great distance from the railway, whilst adding a charm to the outing from a naturalist's point of view, had its disadvantage as regards comfort and approach.

Newton, a compact old-world village, with substantially built farmhouses, mostly erected in the latter part of the seventeenth century, is most pleasantly situated. In the heart of the village is a small quarry, which delighted the geologists by the great number of well-preserved Carboniferous Limestone fossils that it contained, notably a large quantity of crinoid 'heads'—specimens not usually obtainable. Under the guidance of the President of the section, Dr. Derryhouse, this party had a profitable time, and on the side of one of the numerous streams were successful in finding several characteristic zonal fossils.

The geologists were on classic ground. In Knoll Park are enormous rounded hills resembling huge pre-historic tumuli in being so symmetrical. Instead, however, of their containing the remains of British chiefs, they are entirely composed of the dead shells of various molluscs, and in amongst them are corals, zoophytes and trilobites. In fact, the hills are to all intents and purposes, reefs formed in a Carboniferous sea, the great mounds being formed by the accumulation of the shells, etc., of the one-time inhabitants of the water. These reefs were eventually solidified, surrounded by shales containing a different fauna, and the whole buried by thousands upon thousands of feet of strata. The geological history of the district from then to the present time is an exceedingly interesting one, but we can only briefly refer to the last chapter. In comparatively recent times the whole of the superincumbent strata have been denuded—even the shales surrounding the knolls have been largely swept away. But the result is wonderful. There, in the valley, are the heaps of shell remains—now high and dry; otherwise but little changed from that long distant time when they were formed on the ocean floor.

It is true that geologists have different ideas as to the way these hills were formed, but Mr. R. H. Tiddleman was the first to suggest their origin in the way already described, and certainly the very critical examination, made on this occasion, resulted strongly in favour of Mr. Tiddleman's theory—at any rate so far as these particular hills are concerned.

One hill especially, which fortunately had many sections, was examined yard by yard, from base to summit, the investigation extending until a very late hour. From this it was clear that the beds on the top were practically level, whilst the strata dipped outward at a high angle all round, after the manner of a colliery waste-heap. From the various exposures in the district—both in the limestone and in the shale, which in a few places had survived the sub-aerial and glacial erosion—several very fine and rare specimens were secured.

The party included a few antiquaries, who were successful in securing an interesting, if gruesome, relic of the 'good old days.' This consisted of a set of gallows irons, which were doing duty for a very modern purpose on a farm.

The botanists, ornithologists, and, in fact, all the sections found the district a veritable paradise, the appearance of the countryside being much improved by the recent rains.

The botanists were favoured with the leadership of the Rev. W. Crombie and Miss Peel, and were successful in finding the places where quite large series of interesting plants were growing. It rarely happens that there is such a variety of unusual forms as were seen by the botanists on this excursion.

Mr. J. Turner writes:—'Probably the most characteristic plants of the hedgerows were the primrose and the water avens. The common meadow-rue was also noted. A very striking feature of Dunnaw Wood was the broad-leaved garlic, which appeared to be exterminating the wild hyacinth. The rock-rose was growing in profusion on the top of the scar, where also the hairy violet was found, and orpine or live-long was growing on the face of the rock.

The Old Hodder is a veritable botanical paradise, and here the marsh cinque-foil was recorded, though not in flower. Indeed, the season was rather backward, and consequently some plants that were diligently sought were not found. This was the case with the Alpine cinque-foil and Solomon's Seal.

The whole district is exceedingly rich in the variety of its plant forms, and might, with advantage, be visited at the end

of July, when the later species will be making their appearance.'

A complete list of the plants noted on this excursion was prepared, and has been forwarded to the Secretaries of the Botanical Section for preservation.

Mr. H. B. Booth, who had charge of the Vertebrate Section, writes :—' A total of seventy-two species was noted, viz., twelve mammals, fifty-six birds, one reptile, one amphibian and two fishes. The district was chiefly interesting on account of the variable distribution of the ordinary common species, some being abundant, others comparatively scarce, and other species which might have been expected, could not be detected. For instance, it seemed hardly like being in Yorkshire, to be where the Rook, Jackdaw, Hedge-Sparrow, Yellow-Hammer, etc., were rarities, or almost unknown.

The following mammals were noted :—Mole, Common Shrew, Stoat, Fox, Rabbit (abundant), Hare, Water-Vole, Field Vole (common\*), Long-tailed Field Mouse, Common Rat, Squirrel and Hedgehog—the last two apparently being uncommon.

A feature of the district was the abundance of the common rat far away from human habitations and out-buildings. We found them almost everywhere—along the riverside, the mountain-side (Whitendale), and in the keepers' traps in the woods and fields.

Miss M. N. Peel had given a very good forecast of the avi-fauna of the district in the programme for the excursion. No great rarity was noted. As so little has been previously reported from this district, and as the chief interest lies in the somewhat unusual distribution, the species in the following list are given in their *comparative* abundance or scarcity.†

\* The rejected 'pellets' of owls were numerous in the woods. All those examined contained the bones and fur of small mammals, and apparently of the same species—one 'pellet' also containing the elytra of a Dor Beetle. All the nine skulls that I took home for examination were those of the Common Field Vole (*Microtus agrestis*). This destructive little animal must be very numerous in the district—we noticed its runs in several places. It is well that owls are protected, as I do not know any place in the West Riding where a plague of Voles would be more likely to occur.—H.B.B.

† It will be understood that the quantitative terms applied to the different species do not imply that they were present in equal numbers. For instance the Lapwing and Grey Wagtail both come under the term 'Common.' That is as we should consider each of them 'common' in the West Riding.

The following were abundant :—Song Thrush, Blackbird, Starling, House Martin and Willow Warbler ; comparatively common—Robin, Dipper, Blue Tit, Grey and Yellow Wag-tails, Meadow Pipit, Spotted Flycatcher, Swallow, House-Sparrow, Chaffinch, Swift, Cuckoo, Red Grouse, Pheasant, Lapwing, Snipe, Common Sandpiper and Curlew ; fairly common—Mistle-Thrush, Ring-Ouzel, Whitethroat, Great Tit, Wren, Goldcrest, Garden Warbler, Wood Warbler (rather local), Pied Wagtail, Sand Martin, Lesser Redpoll, Skylark, Kingfisher, Sparrow-Hawk, Heron, Ring-Dove, Partridge, Water-Hen, Golden Plover, Redshank, and Lesser Black-backed Gull (seen on several occasions). The Greenfinch and Tree-Pipit were not so common as might have been expected ; and the following species were only seen or heard on one occasion—Redstart, Hedge-Sparrow, Blackcap, Lesser Whitethroat (in Knowlmere Park), Twite (on Newton Fell), Rook,\* Carrion Crow, Nightjar (in Whitendale), Woodcock and Corncrake.

It was rather a surprise that the following species were not met with at all, as the district appeared to be very suitable for them—Wheatear, Whinchat, Jackdaw, Magpie, Yellow-hammer, not any of the Buntings, nor any species of duck. No Owls were seen nor heard, but there was ample proof of the presence of the Tawny and Long-eared Owls by their numerous rejected pellets. The Slow-worm (on top of crag, Dunnaw Wood), was the only reptile ; and the Frog the only amphibian noted. Trout were plentiful in the Hodder, and we saw a large Salmon, quite thirty-six inches long. It was very sluggish, and only moved slowly away when touched.'

Dr. Derryhouse presided at the general meeting at which the reports of the various sections were presented.

T. S.

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Mr. W. Eagle Clarke writes on the 'Chicks of the Sanderling,' and Mr. A. D. Sapsworth on the 'Peregrine Falcon on the Yorkshire Cliffs,' in the July *British Birds*.

In the *Mineralogical Magazine* for July is a paper 'On a New Method of Studying the Optical Properties of Crystals,' by the late Dr. H. Clifton Sorby.

In the July *Bradford Scientific Journal* are the following papers :— 'Local Dart or Hover Flies,' by J. H. Ashworth ; 'Fertilisation of the Sweet Pea,' by P. Clapham ; 'Where the Honey comes from,' by 'Etain' ; 'Living Things and Things Inanimate,' by J. H. Rowe ; and 'Annelid Hunting Around Bradford,' by Rev. H. Friend.

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\* The nearest rookeries appear to be at Dale Head (about 5½ miles), Bromley Wood, (Clitheroe), and Chatburn. We were informed that formerly there was a rookery at Newton.



## FIELD NOTES.

## MOLLUSCA.

***Arion ater* L. as a Wart Curer.**—I have just heard for the second time from the same man how he was cured of a large wart by the application of a black slug. In 1852 or thereabouts he had a very bad wart on the back of his hand. An old woman suggested to his mother that he should see a local tinsmith [Richardson, of Queen Street] about it. He was taken, and the tinsmith rubbed the hand gently, and told him to get up early next—or some other—morning before the sunrise, and look for a black slug. The wart had to be rubbed by the slug, and then the slug had to be impaled on a hawthorn spine, and as the slug melted away, so would the wart. ‘So it was,’ he declared to me, though he could not say how long it took to disappear. In Rhys’ ‘Celtic Folklore,’ in the first volume, this treatment is mentioned, but the doctor’s informant forgot what became of the slug. The whitethorn here has no magic significance, I think. The rest is, of course, sympathy.—S. L. PETTY, Ulverston.

—: o :—

## COLEOPTERA.

***Gracilia minuta* F. at Selby.**—I beg to record the occurrence of this interesting little longicorn here as an importation, a local fruiterer calling my attention to hundreds which were in a hamper conveying French-grown carrots. I submitted specimens to the Rev. A. Thornley, who, quoting ‘Fowler,’ writes—‘In dead twigs in hedges, etc., and often in old hampers etc., local, common, having been recorded for London district, Devon, Hastings, Bristol, Cambridge, Burton-on-Trent, Sunderland (two specimens) perhaps imported. (Not recorded from Scotland).’ Mr. Thornley has recorded it himself from Notts. and Lincoln. Has it been recorded from Yorks. ‘imports’ or otherwise? \*—JOHN F. MUSHAM, F.E.S., Selby.

—: o :—

## BIRDS.

**Brown Rook in N. Lincs.**—A brown, almost chocolate-coloured rook has recently been observed at the rookery near Baysgarth Park. Mr. A. B. Hall informs me he has seen it several times, and that Mr. Frank Bygott, who resides near the rookery, has a similarly coloured bird, stuffed, which he shot many years ago.—G. W. MASON, Barton-on-Humber.

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\* The species is recorded for Hull by Mr. T. Stainforth in ‘Trans. Hull Field Nat. Club,’ Vol. 3, pt. 1, 1903, p. 109; and has been taken at Clapham and Thackley by Mr. F. Booth; recorded in the Y.N.U. Annual Report, 1908, p. 21.—EDS.

## REVIEWS AND BOOK NOTICES.

**A Guide to the Whales, Porpoises and Dolphins in the British Museum (Natural History)**, has recently been issued at 4d. It can be looked upon not only as a reliable guide to the fine series of aquatic mammals in the National Collection, but as a general introduction to this fascinating branch of natural history. That it has been written by Mr. R. Lydekker is sufficient guarantee as to its reliability. There are thirty-three illustrations.

The Bradford Public Libraries' Committee has issued a **Catalogue of the Lees Botanical Collection** in the Reference Library. 36 pp., price 3d.

This contains a list of the botanical books and pamphlets purchased from Dr. Arnold Lees, as well as of a few geological items. To facilitate reference there is an Index of Subjects, and an Index of Authors. These special catalogues are useful, and this appears to have been carefully compiled.

**Birds and their Nests and Eggs** by G. H. Vos. London: George Routledge, 148+223+240 pp. 3/6.

This volume contains, in one cover, the three series, under the same title, which had been previously issued at 1/- each, already noted in these columns. The original pagination, titles, etc., are, however, maintained, giving the volume a patchy appearance. Naturally, the remarks already made in reference to the matter and illustrations also apply to this book. It has the advantage, however, of a brief index, and the volume will make a cheap and acceptable gift to a schoolboy.

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## NORTHERN NEWS.

The following observation from a recent issue of a 'natural history' journal shews with what ability a properly-trained naturalist can explain anything:—'The reason for the rarity of snakes [in Ireland] is possibly the abundance of pigs, which are great devourers of snakes.'

Mr. L. Glauert, F.G.S., has recently contributed a paper on 'A New Species of *Sthenurus*' to the Geological Society of London. This species of Kangaroo had been recognised amongst bones found in the Mammoth Cave, Margaret River, Western Australia.

The mantle of Gilbert White has evidently fallen upon the Vicar of Pontfaen, near Fishguard, who writes that 'House-martins who [sic] have built nests under the eaves of his house, have been regularly fed by hedge sparrows, which took rice from chickens, and carried it to the nests.'

Mr. C. Waterfall has been lecturing before the Hull Junior Naturalists' Society on 'The Causes contributing to the Rarity of Plants.'

'Butterflies Chasing Children at Selby' is the title of a note in 'Wild Nature Week by Week,' *specially contributed* to the 'Yorkshire Evening Post.' We hear that the children have passed a good night at the hospital, but are still suffering from shock.

We regret to learn that Scotter Common, Lincolnshire, has been fired, probably through carelessness, and that about 200 acres of this fine common have been cleared of vegetation, and considerable damage has been done to game, etc.

From Mr. T. Petch, B.Sc., the Government Mycologist in Ceylon, we have received a number of reprints, the most interesting of which deals with 'The Phalloidæ of Ceylon.' Judging from the many excellent plates, these curious fungi are provided with veils. The compositor has evidently not grasped the fact that the specimens belong to the vegetable kingdom, which perhaps accounts for the unfortunate misprint 'Nat. sire' on the plates.

# THE NATURALIST.

A MONTHLY ILLUSTRATED JOURNAL OF  
NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY

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THE MUSEUM, HULL;

AND

T. W. WOODHEAD, Ph.D., F.L.S.,

TECHNICAL COLLEGE, HUDDERSFIELD.

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF

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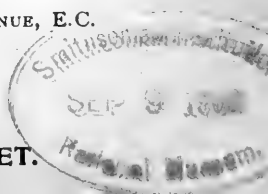
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## NOTES AND COMMENTS.

CHARLES DARWIN AS GEOLOGIST.

Under the above title the Cambridge University Press has published the Rede Lecture, delivered by Sir Archibald Geikie, at the recent Darwin Centenary Celebrations at Cambridge.\* We can cordially recommend this little volume to our readers. In it Sir Archibald points out that hitherto sufficient importance does not appear to have been attached to Darwin's geological work. It was the science of geology that first commanded Darwin's attention, and doubtless its study had much to do with the line of research he followed, with such brilliant results. Sir Archibald, in his familiar masterly manner, deals with Darwin's geological work; his South American, etc., researches whilst on the 'Beagle'; his brilliant discoveries with regard to coral islands; his work on the formation of soils, etc.

### A USEFUL HAMMER.

As illustrating the fact that Darwin was a true field geologist and always provided with a hammer, the story is told that whilst some officers were surveying in the island of San Pedro, a fox (*Canis fulvipes*), a new species, was sitting on the rocks. He was so intensely absorbed in watching the work of the officers that Darwin was able, by quietly walking up behind, to knock him on the head with his geological hammer. 'This fox, more curious or more scientific, but less wise than the generality of his brethren,' is now in the Natural History Museum, South Kensington.

### INTERESTING FIND AT HUDDERSFIELD.

Forty years ago a description of a fossil cone from the Coal Measures was given by Carruthers, and he named it *Volkmannia binneyana*—now known as *Colamostachys binneyana*. Although many specimens are known, in not a single instance has the cone been found in connection with vegetative organs of any kind. In the July 'New Phytologist' Mr. H. Hamshaw Thomas describes and figures a specimen shewing the cone with four whorls of Calamite leaves attached at the base. From the size, shape, and arrangement of these, it may be concluded that they are of the type known as *Colamocladus* (= *Asterophyllites*) *grandis* Sternb, and thus an important advance has been made in this particular branch of palæobotany. The specimen upon which Mr. Thomas's notes are based was found in a calcareous nodule from the Halifax Hard Bed of the Lower Coal Measures of Huddersfield.

---

\* 91 pp., cloth, 2/. net.

## A NATIONAL FOLK-LORE MUSEUM.

Mr. Henry Balfour's Presidential Address to the Museums' Association, delivered at Maidstone on July 13th, is printed in the 'Museums' Journal' for July. In this Mr. Balfour, whose excellent work at the Pitt Rivers Museum in Oxford is well known, advocates the formation of a National Folk Lore Museum. He points out that in the Guildhall Museum, London; the Museum of the Society of Antiquaries in Edinburgh, and in some other museums, more or less definite attention is paid to obsolete and even obsolescent industries, customs and appliances in the British Isles. The British Museum, however, is everything except British as far as ethnology is concerned. There is reticence in dealing with our own nation which is specially noteworthy in view of the name which is applied to this great institution. We trust that something tangible may be the result of Mr. Balfour's appeal

---

**My Life Among the Wild Birds in Spain**, by Willoughby Verner. Bale, Sons & Danielsson. 468 pp., 21/- net.

This book contains a chatty record of the *crème de la crème* of bird-nesting. Colonel Verner, as his writings elsewhere have shown, has been unusually fortunate in his frequent visits to Spain, and with pluck and perseverance, has visited and photographed the nesting sites of a whole host of *rara aves*; he has certainly been in an ornithologist's paradise. He has the further ability of recording his reminiscences in a pleasant style, and with the aid of pencil and camera has produced a volume the only drawback to which we can find is that it is perhaps a little expensive for the ordinary lover of birds. In reading the narrative, it is pleasant to find that the Colonel is by no means a nest-robber, and he is exceedingly bitter in his remarks against those systematic collectors of eggs who, largely for pecuniary gain, bring disrepute to the genuine ornithologist. Amongst the illustrations are scores that will appeal to the British naturalist, those of the Great Bustard, Booted Eagle, Black Kite, Red Kite, Goshawk and Crane being unusually good. The photographs of eggs and nests that are reproduced include several that most English collectors will hardly ever hope to see in nature. There are many interesting experiences related in this volume, which we should like to relate, did space permit; but we must refer our readers to the book itself. There is one, however, which we must mention. A nest of a Bonelli's Eagle, after a heavy climb, was found to contain but one egg. It was taken, and a tame goose's egg was substituted. Soon after, a naturalist, 'who never collected eggs, but only photographed them,' came to this identical old-world place, in search of 'copy.' Some little time after, Col. Verner received an issue of 'Country Life,' containing a most graphic account of the identical nest, and with the apparent purpose of 'for all time recording his ignorance of Eagles and their eggs, the unfortunate writer went into the most minute details as to how the egg he had so gallantly obtained was "white and somewhat pointed at both ends," in fact, an unmistakable tame goose's egg.' As a contrast, Col. Verner gives a photograph of the egg that was in the nest before the goose's egg was substituted. So that even in the wilds of Spain, miles away from 'anywhere,' one should really see the bird lay the egg before being certain it is genuine! In Yorkshire this same trick has been served on more than one occasion, and in all probability at the present time coloured pigeon, etc., eggs are reposing in collectors' cabinets with altogether different labels on them.

## OYSTERCATCHER NESTING AT SPURN.

OXLEY GRABHAM, M.A., M.B.O.U.

EVERY member of the Yorkshire Wild Birds' Protection Committee, and all those who are interested in our county's birds, will be pleased to hear that the Oystercatcher nested at Spurn this season, after an interval of twenty years. Mr. Digby Legard and I received a telegram from Robinson, our watcher, saying that he had at last, after much trouble, found the nest of the Oystercatcher, so we immediately set off for Spurn, and on the morning of June 21st, were fortunate enough to get



*Photo by]*

**Nest and Eggs of the Oystercatcher.**

*[Oxley Grabham.*

two or three successful photographs. We were very anxious not to frighten the bird, so we did not keep her off her eggs for long, but she was by no means wild, and was soon back on her nest after the camera was rigged up.

The nest was on the Humber side, and, as can be seen from the photograph, was a mere scratching in the sand and shingle, partially surrounded by dead sea weed, which had drifted up on the shore. I was in great hopes that the eggs would hatch out safely, and Robinson kept me periodically informed that the hen bird was sitting all right. He could see her a long way off with his glass without going anywhere near the nest, but

I am very sorry to say that although all went well until July 11th, on which date the bird was still comfortably sitting, on July 15th, when Robinson went down, the eggs had been washed away. There had been a tremendous storm of wind and rain, and the water had come some six yards or so beyond the nest. This is a most unfortunate occurrence, and although the birds were



Photo by

**Oystercatcher on Nest.**

[Oxley Grabham

about, Robinson could not see that they had any intention of nesting again when he last wrote to me on August 1st ; but we may hope now that they have started nesting once more in the district, that they will do so next year.

Robinson states in his letter that there were more young Terns on the wing in the middle of July than he had ever seen before.

## NEWS FROM THE MAGAZINES.

In *The Entomologist* for May, Mr. Claude Morley writes that two new species described in his 'British Ichneumons' turn out to be from New Zealand, and are not British.

A list of the 'Land and Freshwater Mollusca in the Scarborough District' is contributed to the July *Journal of Conchology* by Mr. J. A. Hargreaves.

*British Birds* for August contains a 'Photographic Supplement,' in which is reproduced a series of photographs taken by Miss E. L. Turner, showing the extraordinary behaviour of a Water Rail.

*Homalium brevicolle* Thoms., a new British beetle, is described in the May *Entomologists' Monthly Magazine*. The specimen was captured in carrion at Great Salkeld.

In the July *Irish Naturalist* Mr. R. F. Scharff figures and describes a speckled otter, trapped in Lough Sheelin. The only other record of a speckled otter the author has noticed is of one supposed to be in the Hancock Museum, Newcastle. As that specimen seems to have disappeared, the Irish example is unique.



## NATURAL HISTORY OF RUNSWICK.

The two hundred and seventeenth meeting of the Yorkshire Naturalists' Union was held at Runswick, on Saturday, July 10th, and was well attended. The geologists, with Mr. J. J. Burton, F.G.S., as their guide, had a profitable day on the Liassic shale between Runswick and Kettleness. The botanists had the advantage of the leadership of Dr. W. G. Smith (Edinburgh), Dr. T. W. Woodhead, Mr. P. Fox Lee, and Mr. C. A. Cheetham, and in addition to mapping the vegetation features of the area, were successful in securing some interesting plants.

The general meeting was held under the chairmanship of Mr. J. J. Burton, at which the reports of the sectional officers were presented. Three new members were elected. The members passed a vote of sympathy with the relatives of the late Lord Ripon. His lordship had been a member of the Union since its formation, and always took a keen interest in its work.

The following reports have since been received :—

Mr. J. J. Burton, F.G.S., writes :—‘ The geologists had a good field day in a portion of the coast, which gives favourable opportunities for close inspection of the sections of Lias shewn in the cliffs between Runswick Bay and Kettleness point. The bay at Runswick is the mouth of an ancient pre-glacial valley through which a stream of considerable importance must have found its way to the sea. It is now completely blocked with boulder clay, and only a few streams of minor importance have cut into it. Boring operations in the immediate neighbourhood have shewn that this boulder clay deposit extends inland so as to connect up this choked valley with the drainage system of the large stream which has cut its way through the rocks, and formed the ravine at Staithes, where it enters the sea. It is one of the numerous cases in Cleveland where the blocking up of the old river valleys by ice has permanently changed the course of the rivers which once ran through them. The beds of some of the streams flowing through the boulder clay in the bay were examined, and shewed a surprising number of erratics. Many of these were from the Cheviots. Teesdale whinstone and large blocks of limestone were very numerous ; so also were Shap Fell granites. One of the latter blocks measured roughly 4 feet by 3 feet by 2 feet 9 inches. Many other far-travelled boulders were noticed, but the identity of some was not clearly established.

Travelling along the beach towards Kettleness, the succession of strata shewn on the sketch section was passed over, and was, in most cases, easily identified by the discovery of the fossils characteristic of the zone, although the difference in ornamentation and structure of some of the species is so slight, that it may be accidental in development, and not permanent in character, and therefore of doubtful value in assigning variety thereto.



- |                              |                |
|------------------------------|----------------|
| 1.—Lower Oolite.             |                |
| 2.— <i>A. communis</i> .     |                |
| 3.— <i>A. serpentinus</i> .  | } Upper Lias.  |
| 4.— <i>A. annulatus</i> .    |                |
| 5.— <i>A. spinatus</i> .     | } Middle Lias. |
| 6.— <i>A. margaritatus</i> . |                |
| 7.— <i>A. capricornus</i> .  | } Lower Lias.  |
| 8.— <i>A. jamesoni</i> .     |                |

- a. Kettleness.  
 b. Runswick Bay.  
 c. Staithes.  
 d. Boulby = Rockcliffe.

Two faults were located by the evident change in the strata, both having a downthrow to the west. Two physical features of interest to those who have given attention to coast erosion were also noted; and were very striking. First the loosening effect on the cliffs of even very small trickling streams of water, and secondly the undercutting of the hard rocks by the wasting away of the underlying soft shales. The result was shewn in the accumulated debris at the foot of the cliffs, where big blocks of sandstone, deprived of their support, had tumbled down, and lay in picturesque confusion.

Ascending the cliffs at Kettleness the Old Alum Works were visited, and some idea was formed of the extent of this extinct Cleveland industry by observing what an enormous quantity of shale had been quarried.

Returning to the beach, several caves were seen; these might readily be attributed to wave action, but really are old jet workings.

A few cement doggers were observed just round Kettleness point, but these do not seem to be in evidence at all on the Runswick side. Some members staying over the week-end saw how these were carted up to the old cement works at East

Row, for manufacturing "Mulgrave Cement," and evidence of mining them was seen in the cliff in the top portion of the alum shale bed, which is the only place where these nodules appear to be found.'

COLEOPTERA.—Mr. M. L. Thompson reports that the following beetles were met with:—

*Dromius linearis*, Ol.  
*Tachyporus chrysomelinus*, L.  
*Tachyporus hypnorum*, T.  
*Cafius xantholoma*, Grav.  
*Oxytelus rugosus*, F.  
*Oxytelus tetracarínatus*, Bl.  
*Anthobium torquatum*, Marsh.  
*Coccinella 11-punctata*, L.  
*Rhizobius litura*, F.  
*Brachypterus pubescens*, Er.  
*Brachypterus urticæ*, F.  
*Meligethes æneus*, F.  
*Meligethes picipes*, Stm.  
*Enicmus minutus*, L.  
*Atomaria fuscipes*, Gyll.  
*Atomaria atricapilla*, Steph.  
*Corymbites quercus*, Gyll.  
*Helodes marginata*, F.  
*Cyphon variabilis*, Thunb.  
*Telephorus bicolor*, F.

*Telephorus flavilabris*, Fall.  
*Rhagonycha limbata*, Th.  
*Malthodes minimus*, L.  
*Longitarsus suturellus*, Duft.  
*Sphæroderma testacea*, F.  
*Crepidodera transversa*, Marsh.  
*Crepidodera rufipes*, L.  
*Plectroscelis concinna*, Marsh.  
*Anaspis maculata*, Foure.  
*Apion radiolus* Kirb.  
*Apion carduorum*, Kirb.  
*Apion æthiops*, Hbst.  
*Phyllobius pomonæ*, Ol.  
*Phyllobius viridiæris*, Laich.  
*Rhamphus flavicornis*, Clair.  
*Grypидius equiseti*, F.  
*Dorytomus pectoralis*, Gyll.  
*Ceuthorhynchus erysimi*, F.  
*Ceuthorhynchus contractus*, Marsh.  
*Ceuthorhynchidius troglodytes*, F.

The Rev. F. H. Woods writes that the conditions of tide and weather were not favourable for investigations of marine conchology. Nevertheless, the results were by no means without interest, and in most cases the specimens found were those of the living animals. In the roots of the larger seaweeds washed up were some good specimens of the so-called var. *lævis* of *Helcion pellucida*, which should rather be described as a state than a variety, the peculiar shape which the shell acquires being due to the hollow cavity which it makes for itself in feeding. The upper pools abounded in *Chiton cinereus*. One specimen of *Chiton ruber*, and one very large one of *Acmaea virginea* were found. At low tide there were a few specimens of *Acmaea testudinalis*, and great numbers of the tiny little bivalve *Turtonia minuta* among the roots of the smaller algæ, on which a quantity of the fry of *Lacuna pallidula* were feeding. But the most interesting shells were two specimens of what for the present I am disposed to regard as *Rissoa proxima*. The shell in question, which I have found occasionally at Scarborough and elsewhere, is like *Rissoa vitrea* in its cylindrical shape and deep sutures, but has the striæ of *R. striata*. It is possible that it may prove to be the var. *arctica* of the latter,

between which and *R. proxima* there appears to be a good deal of confusion. Some specimens have finer and some coarser striæ, but otherwise they are similar. Jeffrey doubted whether *R. proxima* was a good species. The subject wants thorough investigation, and at present the specimens, even in some of the best collections, are not always satisfactory. Curiously enough the typical *Rissoa striata* was not found in Runswick Bay ; but it is almost certain that it occurs, as it abounds along the Yorkshire coast.

The following is a complete list of species found :—

<i>Chiton cinereus.</i>	<i>Trochus cinerarius.</i>
<i>Chiton ruber.</i>	<i>Lacuna divaricata.</i>
<i>Anomia ephippium.</i>	<i>Lacuna pallidula.</i>
<i>Mytilus edulis.</i>	<i>Littorina obtusata.</i>
<i>Turtonia minuta.</i>	<i>Littorina rudis.</i>
<i>Lutraria elliptica.</i>	<i>Littorina littorea.</i>
<i>Tapes pullastra</i> (var. <i>perforans</i> ).	<i>Rissoa parva.</i>
<i>Cardium edule.</i>	<i>Rissoa proxima.</i>
<i>Saxicava rugosa.</i>	<i>Cypræa europæa.</i>
<i>Zirphoea</i> ( <i>Pholas</i> ) <i>crispata.</i>	<i>Purpura lapillus.</i>
<i>Patella vulgata.</i>	<i>Buccinum undatum.</i>
<i>Helcion pellucida</i> (with var. <i>lævis</i> ).	<i>Fusus antiquus.</i>
<i>Acmæa testudinalis.</i>	<i>Nassa incrassata.</i>
<i>Acmæa virginea.</i>	

Dr. W. G. Smith writes :—‘ The number of botanists present was not very large, but observations were extended over the week-end, and, although it is not possible in a short note to indicate the bearing of the observations on the history of the Cleveland vegetation, a considerable amount of work was accomplished. Special attention was paid to the woods of the coast region, including Mulgrave Woods and those in the steep, narrow valleys of Runswick Bay. One feature of interest is that Birch is not a conspicuous tree on the boulder clay, and in none of the woods was Birch so abundant as it is in the woods of the moorland edge ; the English Maple (*Acer campestre*) was noted as common in all the woods examined, and it must be regarded as typical of the Cleveland boulder clay. The scrub and grassy slopes of the boulder clay was also carefully examined for comparison with the soils over the natural rock. Amongst the typical clay plants, Fleabane, Wood Vetch, Hemp Agrimony, and the Large Horsetail were conspicuous, whereas these were absent over the drier soils over the Lias. The casuals of the unkempt gardens of Runswick also attracted much attention. The most noteworthy record from the floristic side was *Vicia bithynica* found by one of the members of the camping party who devoted their energies mainly to mosses.’

Mr. P. Fox Lee adds that the following plants were observed by Mr. Elgee, of Middlesbrough, and himself. In the upper part of Hob Holes, a fine wooded gorge opening to the coast at Runswick, is a flat expanse of marshy ground covered with a vigorous growth of *Carex acutiformis* Ehrh. Here and in other parts of the Hob Holes were *Valeriana dioica* L., *Veronica officinalis* L., *Pedicularis sylvatica* L., and *Ranunculus hederaceus* L., besides an abundance of *Equisetum maximum* Lam. There were also mushrooms, puff-balls and fairy rings of other fungi in the adjacent grass lands.

T. S.

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The Report and Proceedings of the **Manchester Field Naturalists' and Archæologists' Society** for 1908 has just been received. It contains details of the various excursions of the Society, from January 11th to December 19th. These are chiefly botanical. There is also the Annual Report, List of Members, etc. More care than usual has been exercised in the selection of blocks to illustrate these reports; and amongst them is a portrait of the President, Sir William H. Bailey. There are 100 pages of closely-printed matter. The report is largely spoilt with advertisements of pianos, fire-grates, etc. We hope that the pretty lady in the fearful hat, with its firework-like feathers, inserted in the advertisement on the cover, is in order to warn Manchester lady naturalists what *not* to wear!

The Proceedings of the **Cleveland Naturalists' Field Club, 1907-8**, Vol. II., part 3 (2/-) has just been issued. They are edited by the Rev. J. C. Fowler, and may be obtained from the Secretary, at the Dorman Museum, Middlesbrough. There are illustrations of the more important objects described, one of which we are permitted to reproduce (see p. 211). Mr. F. Elgee writes at length on his favourite theme, 'The Fauna of Cleveland, Past and Present,' giving an excellent summary of the zoological history of the area; the Rev. G. Lane writes on the local jurassic plants; the editor describes a large boulder of shap granite, an Edward III. counter, and 'An interesting geological discovery;' and there are notes on local coleoptera and lepidoptera by Messrs. M. L. Thompson and T. A. Loft-house respectively. The 'geological discovery' is unfortunately vague. It appears the stool of a tree, in position, was found under six feet of 'glacial' drift, 'deposited under torrential conditions, and the tree was evidently overwhelmed.' The tree was found 'as it grew in one of the mild inter-glacial seasons,' etc. The tree '*appears to be oak.*' Cannot some local botanist identify the wood, and some local geologist give a more definite date to the overlying drift? And then, with regard to the Edward III. counter found at Whorlton, which 'may have fallen out of the doublet of one of the royal retainers, who might have been sent to the castle on some royal errand,' etc.; the editor has been to infinite pains to ascertain whether Edward III. was ever at Whorlton, and has even searched at the Public Record Office. At present he cannot find that that king was ever there. But surely many coins of Edward VII. are found in situations where that monarch never was? Our Cleveland friends are to be congratulated on their publication.

The **Annual Report and Transactions of the North Staffordshire Field Club** for 1908-9 (Vol. XLIII.) has just been issued. It contains many interesting papers, as well as an excellent account of a good year's work. Amongst the contributions we notice 'The Evolution of the Cetacean Tail Fin,' by F. W. Ash; 'Lilleshall Hill,' by Dr. Wheelton Hind, and 'The Life History of the River Trent,' by A. M. McAl dowie.

## ON THE GEOGRAPHICAL DISTRIBUTION OF MOLLUSCA IN SOUTH LONSDALE.

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REV. C. E. Y. KENDALL, B.A., J. DAVY DEAN, AND  
W. MUNN RANKIN, M.Sc., B.Sc.

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THE distribution of mollusca over a given area, as of other more or less sedentary forms of life, is noticeably discontinuous; the species constituting the fauna being limited within their stations by life conditions favourable to the individuals. The occurrence of a species within a district is not simply a function of the organisation of the individuals, but to a large extent, is one also of the purely physical conditions of the habitat wherein they obtain. Thus regarding a particular area broadly from the view point of an ecologist to whom the life conditions of a species are of interest not second to the taxonomic rank of the form, there is a closed patchwork of wide habitats showing among themselves much diversity, but within an almost uniformity of conditions, upon which the presence of living forms depends.

In addition to this concept of the grouping together or association of physical factors of biological value, there is the further, of the association of species, which in their individuals find the physical inanimate nature more or less advantageous to their manifold activities. The distinguishing of such natural groups, shewing a biological or ecological uniformity, as immediately concerning vegetation, has been the business during many years of several workers, chief among whom in England is Dr. W. G. Smith. Following the methods laid down in his early papers, and those of his brother, the late R. Smith, not only have the Pennine areas—ridge and flank, from the Peak to the Cheviots been marked out into their vegetation associations—but also that district of South Lonsdale with which our theme is immediately connected. The distinguishing of plant associations, whether of the salt marsh, of the woodland, or of the moorland, is distinct from the effort to make as complete a floral list as may be—a worthy and profitable aim in itself—but in its analysis of the physical factors of climate and soil ruling in the station, and of those arising from the struggle of individual with individual and species with species, as well as of both with the station, there is the further effort to make out the mechanism of the broad biological associations of which

the plant associations are single examples among several. The floral composition of a particular association of plants is to a large extent the register of the operation of a complex of factors working upon the plant individuals as material, which in the main is previous to and independent of the vegetation. Forms of life, other than plants, which, like them, are more or less 'spot-bound,' would seem to be scarcely less dependent upon the definite physical conditions of these associations. Thus, in taking the various plant associations and formations as the basis of a geographical study of mollusca, there is something more than a convenience. A further bond between the molluscan fauna and the florula holds in the holo- or semi-parasitism, for food and home, of snails upon the vegetation. The many plant associations of first importance which have been recognised in the district of South Lonsdale are here recognised as life-associations and made to serve for a preliminary molluscan survey. It appears to us that the loan of the results obtained in one field of natural science to problems in another is amply justified in the present treatment, as well as in the hope for future work on new lines.

The area taken for consideration lies broadly, as a naturally defined tract of diversified country of hill and valley encircled between the sea in the west and the ranges of highlands in the other quarters—to the north the Cumbrian watershed, to the east the Pennine axis, and to the south the Wyresdale escarpment and slope. It comprises not only the lower basin of the Lune, but also of the several rivers which are properly its tributaries entering the shallow waters of Morecambe Bay. Using the usual bio-geographical terms, it covers much of the vice-counties 60 (West Lancashire), and 69 (South Lake District).

The altitude ranges between sea-level and 3000 feet O.D., so that within the limits of the district there is a wide variation within the climatic factors of mean monthly and diurnal temperature of soil and air, of rainfall, of air humidity etc. There may be instanced the contrast in climate between Grange—suggesting the geniality of a Devon sea-village—and the summit of Ingleboro or High Street, little removed from the Arctic tundra.

The soils have abundant variety. The Silurian and Ordovician rocks of the northern buttress, ecologically, stand intermediate between the Carboniferous Limestone of the eastern scars and the Millstone Grits of the southern fells. On the coast

are extensive deposits of estuarine and maritime silts, and within land is an almost universal mantling of glacial drift. In low valley bottoms, remnants of peat moors still continue as relics of the ancient landscape of Lonsdale. Rivers, ditches, pools and the like afford variety of open water, between the soft peaty floods of the mountain becks and the hard clear issues of limestone springs.

Few districts shew a greater variety of vegetation. Of the full series of British marshlands and moorlands few formations are unrepresented. Dry grasslands show all possible variety between the natural pasture of the calcareous rocks and the *Calluna* heath and moor of the grit and shale fells. In the old times the forests of Quernmore and Lonsdale were doubtless wider spread with woodland, though to-day there is an abundance of naturally occurring woodland of Ash and Oak to which recent forestry has added woods of Beech and Pine.

The classification of the formations or groups of associations into which the district may be divided for purposes of biological research, here made applicable to land and freshwater mollusca, is that derived from a consideration of the vegetation not only of the present district, but of many other parts of Britain. Within the limits of the present paper the responsibility for its employment rests upon Mr. Rankin, while the grouping of the mollusca into associations is that of Messrs. Kendall and Dean.

## THE BIOLOGICAL FORMATIONS OF SOUTH LONSDALE.

### TYPE OF COASTLANDS.

#### 1. Salt Marshlands.

Transition to Freshwater Marshlands.

#### 2. Sand-dunes.

(Not typically developed).

### TYPE OF DRY GRASSLANDS

Calcareous Pastures.

Non-calcareous Pastures and Heaths.

### TYPE OF WET GRASSLANDS.

#### 1. Formations of Hard-water Lakes and Ponds.

2. „ Hard-water Rivers and Streams.

3. „ Soft-water Lakes and Ponds.

3<sup>a</sup> „ Canals.

4. „ Soft-water Rivers and Streams,

5. „ Heath Moors.



## TYPE OF WOODLANDS.

## 1. Ash Wood Formation.

A—Damp Ash Wood. }

Aa—Substituted Beech Wood.

B—Dry (Copse, Pavements, etc.)

## 2. Oak-Birch Wood Formation.

A—Damp.

B—Dry and Heathy.

NOTE.—In this paper we have adopted the nomenclature of the Conchological Society's List of the British Non-marine Mollusca (1904) with the exception of preferring *Pupa* for *Jaminia* as the generic name of this group.

## COASTLANDS.

## § 1. SALT MARSHLANDS. Sub-halophile.

(a)—Inner zones (or Reed-formation).

*Paludestrina stagnalis* Baster. Associated with *Littorina rudis* Maton.

A species existing in countless numbers all round Morecambe Bay, in brackish pools at and above high-water mark. The *L. rudis* is the form known as var. *tenebrosa* Mont., as usual in brackish waters.

(b) *Transition to Fresh-water Marsh.* Sub-halophile.

Here the soil-water is at most times fresh, rising from land, though at the periods of very high tides it is brackish.

*Succinea oblonga* Drap. Associated species :—

LAND.	
<i>Agriolimax lævis</i> Müll.	<i>Carychium minimum</i> Müll.
„ <i>agrestis</i> L.	<i>Succinea elegans</i> Risso (rare).
<i>Arion circumscriptus</i> Johnston	WATER.
<i>Vitrea radiatula</i> Alder.	<i>Limnæa pereger</i> Müll.
<i>Punctum pygmaeum</i> Drap.	„ <i>truncatula</i> Müll.
<i>Hygromia hispida</i> L.	<i>Aplecta hypnorum</i> L.
<i>Cochlicopa lubrica</i> Müll.	<i>Pisidium pusillum</i> Gmel.
<i>Vertigo pygmaea</i> Drap.	„ <i>obtusale</i> Pfeiffer.

This rare and local species occurs in great abundance near the estuary of the River Winster, at Meathop and towards Grange-over-Sands. In the heat of summer it is to be found at the bottom of the damp drains which intersect the meadows. It is also to be found sparingly among the stones bounding the marshy land, where, in company with *Limnæa truncatula*, it seems able to exist with a minimum of moisture. It occurs in N. Devon about the dune-marshes of Braunton Burrows.

*Planorbis umbilicatus* (Müller). Associated with :—

<i>Limnæa pereger</i> Müll.		<i>Aplecta hypnorum</i> L.
<i>Planorbis spirorbis</i> L.		<i>Pisidium pusillum</i> Gmelin.

It is the var. *rhombea* Turton of this species which occurs near the Lune Estuary in the drains and ditches which are in all probability subject to an inrush of salt water in flood seasons. Var. *rhombea* also occurs in the salt-marshes of the Thames Estuary, in salt-marshes at Blytheburgh (Suffolk), and in the marshes between Lewes and Newhaven (Sussex).

§ 2. SAND DUNES—Xerophile. None in the district.

### DRY GRASSLANDS.

CALCAREOUS PASTURES. Sub-Xerophile and Calco-phile.

I. *Carboniferous Limestone*. (Examples at Silverdale, Grange, etc.).

*Pyramidula rupestris* Drap. Associated species :—

<i>Agriolimax agrestis</i> L.		And locally
<i>Pupa cylindracea</i> da Costa.		<i>Pupa muscorum</i> L.

This is one of the most characteristic species of the Limestone region, and has an uninterrupted range. It is essentially a *Helix* of the rock surfaces which it much resembles. Even during the heat of the day it will remain exposed to the sun's rays while the Pupæ retreat into the crevices of the rock or the roots of the grasses. *Pupa muscorum* is more abundant on the lower sea-ward pastures than on the higher ground. *Pyramidula rupestris* with *Pupa cylindracea* is a distinctive feature of Limestone pasture at high altitudes, though *P. rupestris* alone even extends to the summit of Skiddaw (3054 feet) on Ordovician Grits.

*Helicella caperata* Mont

(a) In conjunction with *Thymus serpyllum* is associated with :—

<i>Agriolimax agrestis</i> L.		<i>Helicella itala</i> L.
<i>Arion intermedius</i> Normand (rare).		<i>Hygromia hispida</i> L.

In conjunction with *Tanacetum vulgare* is associated with :—

<i>Agriolimax agrestis</i> L.		<i>Hygromia rufescens</i> Penn.
<i>Arion ater</i> L.		„ <i>hispida</i> L.
<i>Vitrea cellaria</i> Müll.		<i>Helix aspersa</i> Müll.
„ <i>nitidula</i> Drap.		

On the Millstone Grit in conjunction with *Tanacetum vulgare* we find *H. caperata* associated with:—

<i>Agriolimax agrestis</i> L.		<i>Helix aspersa</i> Müll.
<i>Arion ater</i> L.		„ <i>hortensis</i> Müll.
<i>Hvgromia hispida</i> L.		<i>Ena obscura</i> Müll.
„ <i>rufescens</i> Pennant.		

As these associations occur near the sea, probably the characteristic species is *H. itala*—with *H. caperata* in Lonsdale as the dominant. For elsewhere one often finds on the dry pastures near the coast, *H. itala* in abundance, associated with *H. virgata*, *H. caperata* and *H. cantiana*.

*H. caperata* exists in Lonsdale in colonies on the drier seaward pastures, and on the windward (here the western side) of calcareous pastures further inland. It is the only species of the *Helicella* group which can be considered as well established in this district. *H. virgata*, so abundant elsewhere, is entirely absent. *H. itala* seems confined to just a few places, and can rarely be taken in any numbers.

*Vallonia excentrica* Sterki.

*Vertigo pygmaea* Drap. (Example—Far Arnside).

These two species will be found in dry weather under loose stones lying in the open pastures at a low level—often in a dry exposed situation. While either species may also be found in the Wet-Grassland or Woodland sections, the above is a characteristic feature in their distribution.

*Pupa secale* Drap. (Example—Witherslack).

Separating the low-level seaward pastures from the higher wind-swept pavements or grazing lands, there are in some places vertical rock faces often of a considerable height. On several of these occurs *Pupa secale* associated with *Pyramidula rupestris* (as the dominant) and *Pupa cylindracea* da Costa. It is really a southern type, abounding on the calcareous formation and the most northerly station so far recorded is Scout Scar, Kendal. Like *P. rupestris* it seems to need very little moisture. Similarly the southern *Pomatias elegans* finds in the district its most northerly extension, which is paralleled by the distribution of *Asperula cynanchica* and *Clematis Vitalba*.

Sub-section—SUBTERRANEAN..

*Caecilioides acicula* Müller. (Example—Silverdale).

An isolated species \*—

(To be continued).

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\* Possible association is with *Vitrea crystallina* Müller, a species almost subterranean in its habits, and common in the district.

## FUNGI IN THE NEIGHBOURHOOD OF SELBY.

C. CROSSLAND, F.L.S.

ON the 22-24th May, Messrs. W. N. Cheesman, Thos. Gibbs, H. C. Hawley and the writer visited Eskrick, Osgodby, Stainer, and Bishop's Woods, in the neighbourhood of Selby. The two former are situate within the S.E., and the two latter within the Mid.-W. divisions of the county, which join near Selby.

The principal object was to search for fungi which only make their appearance in the spring season; such, for instance, as *Acetabula*, *Verpa*, *Gyromitra*, *Metrophora*, and other uncommon species, as well as *Morchella* and a few of the larger *Pezizæ*.

Though we did not meet with much success in our special object, we met with no fewer than ninety other species—an exceedingly good haul for the time of the year. When the material gathered was worked through, it was found that four were new to the county Fungus Flora. These are:—

<i>Corticium violaceolivium</i> Fr. On dead branch, Bishop's Wood.	<i>Valsa salicis</i> Cke. (= <i>Diaporthe salicella</i> Sacc.). On dead willow-twigs, Osgodby Wood.
<i>Peniophora pubera</i> Fr. On dead branch, Stainer Wood.	<i>Gonytrichum caesium</i> Nees. On dead wood, Bishop's Wood.

Besides these, the following were added to the S.E. and Mid.-W. divisions:—

### S.E. All Eskrick.

<i>Fomes igniarius</i>	<i>Didymella tosta</i>
<i>Polyporus chioneus</i>	<i>Heptameria devasa</i>
<i>Lasiosphaeria ovina</i>	<i>Dasyscypha fugiens</i>
<i>Ombrophila clavus</i>	

### Mid. W.

<i>Peniophora cinerea</i> , B.W.	<i>Ryparobius dubius</i> St. W.
„ <i>hydroides</i> , B.W.	<i>Orbilia luteorubella</i> , B.W.
<i>Ustilago longissima</i> St. W.	<i>Melanconium bicolor</i> , B.W.
<i>Valsa platanoides</i> , St. W.	<i>Cephalosporium acremonium</i> , B.W.
<i>Eutypa lata</i> , St. W.	<i>Rhinotrichum repens</i> , B.W.
<i>Byssosphaeria aquila</i> , B.W.	<i>Periconia pycnospora</i> , B.W.
<i>Heptameria acuta</i> , St. W.	<i>P. podospora</i> , B.W.
<i>Helotium ferrugineum</i> B.W.	<i>Macrosporium commune</i> , St. W.
<i>Beloniidium pruinosum</i> , St. W. ; B.W.	<i>Graphium flexuosum</i> , B.W.

B.W. = Bishop's Wood; St. W. = Stainer Wood.

The Annual Report of the **Yorkshire Philosophical Society** for 1908 has just been received. It contains an admirable and well-illustrated paper on the Samian ware in the York Museum, by Mr. T. May, and also an illustrated paper by Mr. J. Blackhouse on 'A Vanishing Yorkshire Village' [Kilnsea]. We notice [p. 13], that an addition has been made to Robinson's 'East Riding Flora' by the discovery of the Marsh St. John's Wort, at Buttercrambe. This should read 'an additional locality' only

## FIELD NOTES.

## MOLLUSCA.

**A new Lincs. locality for *Paludestrina confusa*.—**On Bank Holiday (August 2nd) Mr. V. Howard, M.A., and the writer searched the marsh drains at Theddlethorpe St. Helen for freshwater mollusca. In a drain running at right angles to, and about a furlong distant from, the sandhills near the old brickyard, we found *Paludestrina confusa* in abundance. This locality, though in the same division (9) as Saltfleetby, where this species was previously found, is about two-and-a-half miles distant southward.—C. S. CARTER, Louth,

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## BIRDS.

**Cuckoo reared by a Wagtail.**—In a coal-yard adjoining the Horncastle Railway Station, and a few yards from the canal, a porter observed a Cuckoo apparently incubating on the ground. He afterwards examined the spot, and found a Cuckoo's egg laid in the nest of a Wagtail among fragments of coal. He continued to keep the nest under observation, and the young Cuckoo was eventually hatched, and reared by the Wagtail, until it was strong enough to fly away. This was early in July.—J. CONWAY WALTER, Langton Rectory, Horncastle.

**Occurrence of the Little Gull in Northumberland.**—A Little Gull, in unusual immature plumage, was seen by Messrs. H. B. Booth, G. A. Booth, and myself, in the harbour at Seahouses on the evening of July 18th. When first seen it was swimming in company with a party of Black-headed Gulls, though keeping itself somewhat aloof from them. It flew round about, and quite close to us several times, then flew on to the rocks at the south of the harbour, and settled there. After a little time it again flew into the harbour, and after circling round once or twice, disappeared in the direction of Bamborough. The plumage, with the exception of the head being darker, was like the figure in Dresser's 'Birds of Europe.'—R. FORTUNE.

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## BOTANY.

***Ricciocarpus natans* L.**—I collected this plant near Doncaster last June in a pond among *Scirpus lacustris*. It grew best and almost pure when well shaded; in some places *Lemna trisulca* was associated with it, but in the more open parts of the pond the *Lemna* was much more abundant, the *Ricciocarpus* being here absent.—W. WEST.

**COLEOPTERA.**

***Gracilia minuta* F. in Yorkshire.**—As mentioned in an editorial footnote, in reply to a query by Mr. J. F. Musham ('Nat.', Aug. 1909, p. 303), *G. minuta* was taken and brought to me last year by Mr. F. Booth, both at Thackley, near Bradford, and at Clapham; and in each case from umbelliferous flowers. In both instances I think, there can be no doubt about the species being indigenous. Mr. Booth diligently secures for me all the species of coleoptera which come in his way when collecting mollusca, and by this means has added many interesting species to our local list.

Some time ago Mr. F. Bamford gave me a number of specimens of *G. minuta* which he had found emerging from some new wooden bobbins at the great silk factory—Lister & Co., Ltd.—at Manningham. In this case I think we must write them down as probably introduced with the timber from which the bobbins were made.—J. W. CARTER, Bradford.

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## ERRATIC BOULDERS AT BARDNEY ABBEY.

F. M. BURTON, F.L.S., F.G.S.

IN the excavations at Bardney Abbey which, through the agency of the Rev. C. E. Laing are now being carried out, three boulders are exposed, which had been utilised by the old builders of the Abbey as corner stones in making its foundation. All three are from the Spilsby Sandstone, similar to the four unfossiliferous boulders recently described by me in this year's volume of 'The Naturalist,' page 93.

One of these boulders is a 'squared' stone let into the N.W. buttress of the Abbey, 3 ft. 11 in. long  $\times$  1 ft. 4 in. broad and 1 ft. 4½ in. deep.

Another, also 'squared,' forms part of the S.W. corner of the Abbey, and measures 1 ft. 9 in. in length  $\times$  5 in. in breadth, and is 10 in. deep.

Close by it is a third small boulder, let in near this last one, which measures 1 ft. 3 in.  $\times$  9 in.

There is a fourth unworked boulder from the same source—the Spilsby Sandstone—lying imbedded in the open field near the Abbey. This measures 4 ft. 8 in. in length  $\times$  3 ft. 4 in. in breadth, and is, probably, about 2 or 3 ft. deep, like the boulders already described in the paper above referred to.

# THE PHYTOPLANKTON OF THE ENGLISH LAKE DISTRICT.

WM. WEST, F.L.S.,

AND

G. S. WEST, M.A., D.Sc., F.L.S.,

(Continued from page 292).

## FLAGELLATA.

23. *MALLOMONAS LONGISETA* Lemm. in Arkiv för Botanik utgifv. af K. Sv. Vet.-Akad. Bd. 2, No. 2, 1904, p. 118.

This Flagellate was observed in Brothers' Water, Easedale Tarn, and Windermere; and in the first-mentioned lake it was

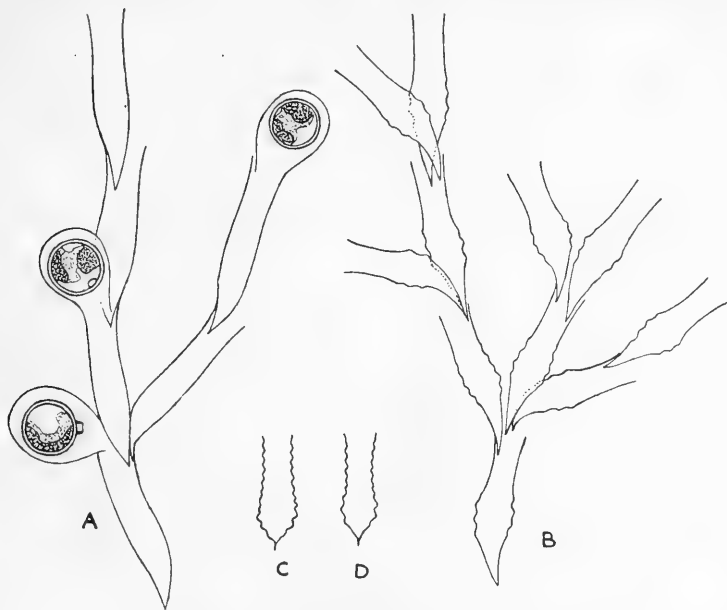


FIG. 7. A., *Dinobryon cylindricum* Imhof, from the plankton of Crummock Water, showing three resting spores; B., *D. cylindricum* var. *divergens* (Imhof) Lemm., from the plankton of Derwent Water; C. and D., *D. crenulatum* sp. n., from the plankton of Ennerdale Water. All  $\times 500$ .

the dominant constituent of the September plankton. Long. cell,  $29.5-37\ \mu$ ; lat. cell,  $17-21.5\ \mu$ ; long. spin.,  $54-62\ \mu$ . It is known in the plankton of the Scottish lakes, but this is the first English record. The spiny covering is particularly conspicuous in this species, and the cell possesses a single brown parietal chromatophore and one flagellum.

24. *DINOBRYON CYLINDRICUM* Imhof. This colonial Flagellate is general in the plankton of all the British lake-areas. It was the dominant feature of the May plankton of Crummock Water, and a large proportion of the cells had formed resting-spores (*vide* fig. 7 A). These were first described and figured by Lemmermann (in 'Forschungsber. Biol. Stat. Plön,' XI., 1904, p. 307, fig. 3, 4). Diam. of outer wall or membrane, 9-11.5  $\mu$ ; length, 48-59  $\mu$ ; diam. resting spor., 13-14  $\mu$ .

Var. *DIVERGENS* (Imhof) Lemm. in 'Ber. Deutsch. Botan. Ges.', XVIII., 1900, p. 517, t. 19, f. 15-20. *D. divergens* Imhof. *D. Sertularia* var. *undulatum* Seligo. *D. subdivergens* Chodat. *D. divergens* var. *levis* Garbini.

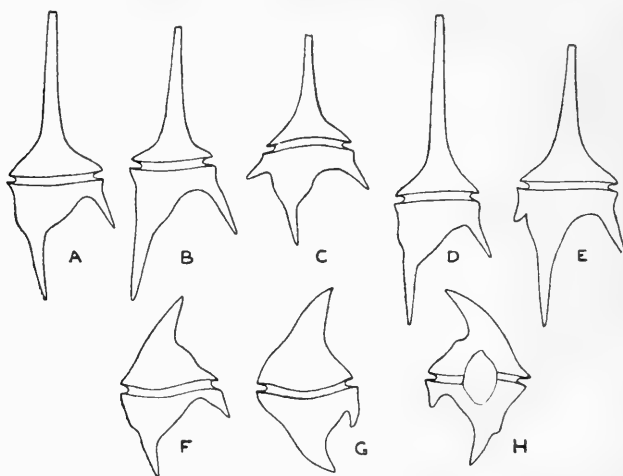


FIG. 8. A.-E., *Ceratium hirundinella* O. F. Müller. All dorsal views. A., from Derwent Water; B., from Brothers' Water; C., from Windermere; D., from Ennerdale Water; and E., from Ulleswater.

F.-H., *C. cornutum* (Ehrenb.) Clap. & Lachm.; F. and G., dorsal views; H., ventral view; F., from Grasmere; G. and H., from Brothers' Water. All  $\times 200$ .

This variety is the most abundant of all the Dinobryons in the British plankton, occurring both more commonly and in greater quantity than typical *D. cylindricum*. The membrane of the individual cell is very characteristic, and so is the general disposition of the colony. (Consult plate VI., and text-fig. 7 B). The June plankton of Derwent Water consisted mostly of immense quantities of this form. In some of the specimens, more especially those from Stickle Tarn, the upper part of the outer wall was undulate almost as in var. *Schauinslandii* Lemm.



25. *DINOBRYON CRENULATUM* sp. n. (Fig. 7 C and D). Membrana evacuata firma et hyalina, elongato-campanulata, parte basali leviter dilatata et in stipitem tenuem brevem producta, lateribus leviter concavis; margine toto undulato-crenulato, crenulis 9-12 utrobique.

Long. cum. stip. 31-32  $\mu$ ; long. stip. 2  $\mu$ ; lat. bas., 9.5-10  $\mu$ ; lat. med., 7.5-8  $\mu$ ; lat. oscul., 8-8.5  $\mu$ .

*Hab.* In the plankton of Ennerdale Water (May 1903).

Only solitary individuals of this species were seen, and we have no evidence to show that colonies are ever formed. It differs from all the known species in its completely crenulate wall from base to apex.

#### PERIDINIEÆ.

26. *CERATIUM HIRUNDINELLA* O. F. Müller. This species is the most generally distributed of all the Peridinieæ in the British freshwater plankton. There is a strange absence from the English lakes of the common four-horned form which is so plentiful in the Scottish and Irish lakes (consult 'Trans. Roy. Soc. Edin.', XLI., 1905, part III., p. 494, fig. 1 C and D; and 'Trans. Roy. Irish Acad.', XXXIII., sect. B. 1906, part II., p. 94, figs. 6-8). The only four-horned form observed occurred in Windermere, and all the horns were stunted, especially the apical horn (Fig. 8 C). A form similar to this has been observed by Bachmann in the Thunersee, and also in the Zugersee, in Switzerland. All the other forms seen were three-horned, except those from Ulleswater and Hawes Water, which possessed a trace of the fourth horn (fig. 8 E). The commonest forms observed were three-horned, with the median antapical horn disposed parallel to the longitudinal axis.

In no single instance was *Ceratium hirundinella* observed abundantly in the English lakes. It is general and frequent, but does not appear to form large maxima.

27. *CERATIUM CORNUTUM* (Ehrenb.) Clap. & Lachm. This species is much less frequent than the preceding, and was only observed from Brothers' Water and Grasmere (fig. 8 F-H). There is much variability in the curvature of the horns, and we are inclined to believe that *C. curvirostre* Huitfeldt-Kaas is only a form of it.

28. *PERIDINIUM WILLEI* Huitfeldt-Kass in 'Vidensk. Skrifter,' 1900, No. 2, p. 5, fig. 6-9; Börg. & Ostenf. in 'Botany of the Faeröes,' 1903, p. 622, fig. 150; Lemm. in 'Archiv für Hydrobiol. u. Planktonkunde,' III., 1908, p. 376,

figs. 13-16; *P. alatum* Garbini in 'Zool. Anzeig.', 1902, p. 122, fig. A, B.

This is the only generally distributed species of the genus *Peridinium* in the English Lake District. It was found in almost all the lakes examined, and often occurred in large quantity, being much more abundant than in any of the other British lake-areas. Like *Ceratium hirundinella*, it is a summer form, with its maximum in August. Long.  $56\ \mu$ ; lat.  $60\text{--}64\ \mu$ ; crass. max.  $44\text{--}47\ \mu$ . (Text-fig. 4 A—G).

*P. Willei* is a very distinct species, and maintains its characters very constantly. The group of five small apical plates, forming the extreme anterior margin of the epivalve, is one of its principal features. These plates vary within certain limits, but are very constant in their position (*vide* fig. 4 A-C). Another of its features is the possession of two small wing-like extensions of the ventral margins of the antapical plates. Each of these is furnished with a number of very short and delicate spines, and they are best seen when the cell is very slightly oblique. The plates are rather finely areolated, the areolations gradually becoming more pronounced as the age of the cell increases.

#### V.—THE PECULIARITIES OF THE ENGLISH LAKE-PLANKTON.

The phytoplankton of the English Lakes contains a varied assortment of Algæ, 64 per cent. of which belong to the Chlorophyceæ, 21 per cent. to the Bacillariæ, and only 9.5 per cent. to the Myxophyceæ. Thus, the phytoplankton is essentially Chlorophyceous, with a plentiful admixture of Diatoms, and but a few Blue-green Algæ.

		Species.	Varieties.
Chlorophyceæ	{ Desmidiaceæ ..	96	13
	{ Remainder (excl. Desm.) ..	24	2
Bacillariæ	.. ..	41	3
Myxophyceæ	.. ..	17	0
Flagellata ..	.. ..	4	2
Peridiniæ	.. ..	6	0
Total		188 species	20 vars.

Of 120 species of Chlorophyceæ, 96 are Desmids, so that 51 per cent. of all the species recorded for the plankton belong to

the Desmidiaceæ. In some of the lakes Desmids are abundant, but they rarely occur in such prodigious quantities as certain species of Diatoms and Flagellates, although the May plankton of Ennerdale Water, and also of Easedale Tarn, was for the most part a Desmid plankton. Notwithstanding the fact that the English Lakes contain a *high percentage of species*, taken generally, they are not so rich in actual *numbers* of Desmids as the Scottish or Welsh lakes. The most frequent Desmids are : *Staurostrum anatinum*, *St. Arctiscon*, *St. curvatum*, *St. jaculiferum*, *St. lunatum* var. *planctonicum*, *C. subtumidum* var. *Klebsii*, *Xanthidium antilopæum* and vars., *Arthrodesmus Incus*, *A. triangularis*, and *Spondylosium pulchrum* var. *planum*. In the plankton of some of the lakes, and especially in that of Brothers' Water, *St. Arctiscon* is abundant.

*Staurostrum sexangulare* was present in the plankton of Ennerdale Water, and *St. Ophiura* in Easedale Tarn.

*St. Ophiura* is a feature of the plankton of many of the Scottish,\* Welsh, and Scandinavian lakes ;† and its occurrence in the plankton of Easedale Tarn is very interesting.

Until British plankton-investigations were started about eight years ago, both *St. Arctiscon* and *St. Ophiura* were regarded as amongst the rarest of British Desmids. It is now known that both occur in myriads in the plankton of certain lakes, whereas they are very rarely found in the surrounding bogs, or even at the boggy margins of the lakes in which they occur. The occurrence of *Micrasterias pinnatifida*, *M. radiata*, and *M. mahabuleshwarensis* var. *Wallichii* is also of great interest in comparison with the plankton of the other British lake-areas.

The general abundance of *Spondylosium pulchrum* var. *planum* deserves special emphasis. It also occurs abundantly in the Scottish and Irish lakes. Bachmann has recorded the occurrence of '*Spondylosium pulchrum*' in several Scottish lochs,‡ but in this he is wrong. Typical *Spondylosium pulchrum* does not occur in the British Islands, but Wolle's var. *planum*, which is much smaller, more regular, and without any twist in the filaments, is quite common in the British plankton.

\* W. & G. S. West in 'Journ. Linn. Soc. Bot.', XXXV., Nov. 1903, pp. 530 and 550 ; in 'Trans. Roy. Soc. Edin.', XLI., 1905, p. 487.

† Lemmermann, 'Das Plankton Schwedischer Gewässer,' Arkiv. för Botanik utgiv. af K. Sv. Vet.-Akad. Bd. 2, No. 2, 1904 ; Huitfeldt-Kaas, 'Planktonundersögelser,' I., Norske Vande, Christiania, 1906.

‡ Bachmann, *loc cit.*, 1907, pp. 21, 26, 27, 30, 88.

The British lakes are remarkable beyond all other European lakes (with the possible exception of the Scandinavian) in the richness of their Desmid-flora. We have elsewhere discussed the possible connection between this abundance of Desmids and the Older Palæozoic and Precambrian strata which form the great mass of the rocks constituting the drainage-basins of so many of these lakes. It also seems highly probable that the chief determining factor in this richness is a chemical one.

Bachmann, in his remarks upon the Desmids of the Scottish plankton, makes the mistake of generalising from a few samples. He states that Desmids seldom form a dominant feature of the plankton, and that a Desmid-plankton is only characteristic of small lakes. Both these statements are quite erroneous concerning the plankton of any of the British lake-areas.

The following table will give some idea of the abundance of Desmids in the British lakes as compared with some of the lakes of Continental Europe. The numbers are percentages of the total species observed in the phytoplankton. The percentages of Bacillariæ and Myxophyceæ are also given for comparison.

LAKE-AREAS	DESMIDIACEÆ	BACILLARIÆ	MYXOPHYCEÆ
Scottish . . .	49.4%	17.7%	8.7%
Irish . . .	41.7%	19.0%	13.3%
Welsh . . .	62.4%	11.1%	7.4%
English . . .	51.0%	21.0%	9.5%
Swiss* . . .	12 %	29 %	13 %
Scandinavian*	27 %	22 %	12 %

In the English lakes there are relatively few Protococcoideæ, and no species can be described as common. *Glæocystis gigas* and *Sphaerocystis Schroeteri* are the most generally distributed species, but even they are rarely abundant. There is an entire absence of *Pediastrum simplex* and *P. duplex*, and also of the genus *Kirchneriella*.†

\* The percentages given for the Swiss and Scandinavian lakes are only approximate. The percentages of the three groups in the German lakes have not been accurately ascertained, but the percentage of Desmidiaceæ is low (under 10%) whereas the percentages of Bacillariæ and Myxophyceæ are very high.

† The absence of *Kirchneriella* from the plankton of the English lakes is rather remarkable, as the commonest British species—*K. obesa* W. & G. S. West (in 'Journ. Roy. Micr. Soc.', Feb. 1894, p. 16)—was first described from small ponds near Bowness under the name of '*Selenastrum obesum*' (vide West, *ibid.*, Feb. 1892, p. 22).

The Diatoms are very conspicuous in the plankton of some of the English lakes, and although they are represented by only one third as many species as the Chlorophyceæ, they are often the dominating constituents. Especially noticeable are *Asterionella gracillima*, the two species of *Tabellaria*, and *Melosira granulata*.

*Gomphonema geminatum* occurred in fair quantity in the plankton of Wastwater and of Hawes Water. We have also recorded it quite common freely floating in Loch Tay.\* This species is normally attached and can be obtained in pure masses in many of the mountain cataracts. Numerous individuals evidently get washed down by heavy rains into the limnetic region of the lakes, where they live for some time before perishing.

The Myxophyceæ are almost as poorly represented as in the Scottish lakes, the number of species being relatively few. *Cælosphaerium Kützingerianum* attained considerable abundance in both Crummock Water and Hawes Water, but the genera *Lyngbya* and *Anabæna* were barely represented, and species of *Oscillatoria* were not frequent.

Among the Flagellates the genus *Dinobryon* is conspicuous, and so far as the English lakes are concerned, *D. cylindricum* and its var. *divergens*, are much the most abundant forms. At the end of May and beginning of June, the three lakes, Derwent Water, Crummock Water and Grasmere, possessed a *Dinobryon*-plankton (*vide* plate VI.). In Windermere the maximum of *Dinobryon cylindricum* was in September.

*Mallomonas longiseta* occurred in great abundance in September in Brothers' Water, whereas the same organism attained a decided maximum in December in Windermere.

The most conspicuous member of the Peridinieæ is *Peridinium Willei*. This organism is abundant in nearly all the lakes, and occurs in much greater quantity than in either the Scottish or Irish lakes. It is one of the leading features of the plankton of the English Lake District.

Among the numerous species recorded as constituents of the phytoplankton of the English lakes, some are *true constituents*, either not occurring elsewhere in the drainage-areas of the lakes, or occurring much more abundantly in the plankton than in any other situations. The remainder are only

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\* *Vide* 'Trans. Roy. Soc. Edin.', Vol. XLI., part III., 1905, p. 491.

casual or adventitious constituents, washed into the lakes by the rains, and there either perishing very rapidly, or existing for a more or less extended season. As stated before, it is our previous detailed acquaintance with the general Alga-flora of the drainage basins which has enabled us to clearly recognise the true plankton-constituents from those which are casually introduced by the drainage into the lakes.

The following species and varieties are exclusively confined to the plankton :—*Micrasterias mahabuleshwarensis* var. *Wallichii*, *M. radiata*, *Cosmarium abbreviatum* var. *planctonicum*, *C. capitulum* var. *groenlandicum*, *Xanthidium antilopæum* vars. *depauperatum* and *triquetrum*, *X. subhastiferum* var. *Murrayi*, *Arthrodesmus crassus*, *A. triangularis* var. *subtriangularis*, *Staurastrum curvatum*, *St. cuspidatum* var. *maximum*, *St. jaculiferum*, *St. longispinum*, *St. lunatum* var. *planctonicum*, *St. Ophiura*, *St. pseudopelagicum*, *Spondylosium pulchrum* var. *planum*, *Ankistrodesmus Pfitzeri*, *Elakatothrix gelatinosa*, *Oocystis lacustris*, *Sphærocystis Schræteri*, *Tabellaria fenestrata* var. *asterionelloides*, *Asterionella gracillima*, *Rhizosolenia morsa*, *Anabæna Lemmermanni*, *Oscillatoria Agardhii*, *Gomphosphæria lacustris*, *Microcystis æruginosa*, *M. incerta*, *Mallomonas longiseta*, and *Ceratium hirundinella*.

The following are much more abundant in the plankton than elsewhere :—*Euastrum verrucosum* var. *reductum*, *Micrasterias* Sol, *Cosmarium depressum*, *C. subtumidum* var. *Klebsii*, *Staurastrum anatinum* and vars., *St. Arctiscon*, *St. Brasiliense* var. *Lundellii*, *St. denticulatum*, *St. furcigerum*, *St. paradoxum* var. *longipes*, *St. sexangulare*, *Botryococcus Braunii*, *Cyclotella compta*, *Melosira granulata*, *Fragilaria crotonensis*, *Asterionella formosa*, *Surirella robusta* var. *splendida*, *S. biseriata*, *Lyngbya bipunctata*, *Cælosphærium Kützingianum*, *Microcystis pulvereæ*, and *Peridinium Willei*.

It is particularly noticeable in the English Lake District that a greater bulk of plankton occurs in those lakes which are slightly contaminated by the presence on their shores of small villages and farms than in those lakes free from contamination. The greater bulk of plankton-organisms is most probably due to the slight increase in the amount of food-constituents, especially nitrates, consequent upon the slight sewage contamination.

We have no evidence in support of the view put forward

by Huitfeldt-Kaas\* that small depth is favourable and great depth unfavourable to the development of plankton. On the contrary, there is a very considerable phytoplankton and zooplankton in Loch Morar, Inverness,† which is not only the deepest lake (1017 feet) in the British Islands, but the eighth deepest lake in Europe. Likewise the great African lakes have an enormous phytoplankton,‡ with a depth exceeding 1300 feet in Tanganyika, of 1200 feet in Lake Nyasa, and of 620 feet in Victoria Nyanza. Many facts tend to prove that the presence of available food-constituents in the form of dissolved salts is the principal determining factor in the quantitative development of plankton, and that this may result from several causes, not the least of which is the slight sewage contamination in so many of the European lakes.

#### DESCRIPTION OF PLATE V.

PHOTOMICROGRAPHS OF PLANKTON FROM ENNERDALE WATER ( $\times 100$ ).

1 and 2, *Peridinium Willei*; 3 and 4, *Ceratium hirundinella*; 5, *Xanthidium antilopæum* var. *depauperatum*; 6 and 7, *Staurastrum dejectum*; 8, *St. jaculiferum* (biradiate form undergoing division).

9-11, *Peridinium Willei*; 12, *Ceratium hirundinella*; 13 and 14, *Staurastrum curvatum* (or *St. dejectum* ?); 15, *St. longispinum*; 16, *St. jaculiferum* (biradiate form); 17, *St. furcigerum*.

#### DESCRIPTION OF PLATE VI

PHOTOMICROGRAPHS OF PLANKTON FROM CRUMMOCK WATER ( $\times 100$ ) AND FROM DERWENT WATER ( $\times 200$ ).

1 and 2, *Dinobryon cylindricum* (with immature resting spores); 3, *Melosira granulata*; 3, Stout form of *Staurastrum anatinum*.

5 and 6, *Dinobryon cylindricum* var. *divergens*; 7, *Cyclotella compta*.

#### DESCRIPTION OF PLATE VII.

PHOTOMICROGRAPHS OF PLANKTON FROM WINDERMERE ( $\times 100$ ), UPPER PHOTOGRAPH OF JUNE PLANKTON, AND LOWER ONE OF SEPTEMBER PLANKTON.

1 and 2, *Asterionella gracillima*; 3, *Tabellaria fenestrata* var. *Asterionelloides*.

4, *Asterionella gracillima*; 5, *Tabellaria fenestrata* var. *asterionelloides*; 6 and 7, *Xanthidium subhastiferum* var. *Murrayi*; 8, *Spondylosium pulchrum* var. *planum*; 9 and 10, *Staurastrum paradoxum* var. *longipes*; 11, *St. jaculiferum*.

\* Huitfeldt-Kaas, *l.c.*, 1906, p. 185.

† W. & G. S. West in 'Trans. Roy. Soc. Edin.', Vol. XLI., part III., 1905, p. 481 *et seq.*

‡ G. S. West in 'Journ. Linn. Soc. Bot.', XXXVIII., 1907, pp. 81-192.

# CORNICULARIA KOCHII CAMB.—A SPIDER NEW TO GREAT BRITAIN.

## WITH A KEY TO THE BRITISH CORNICULARIÆ.

WM. FALCONER,  
*Linthwaite, Huddersfield.*

(Continued from page 298).

(b) Limbs of apophysis converge.

Inner limb without a basal

tooth . . . . . KARPINSKII Cambs.

B.—Ocular area without a tubercle. Tibial apophysis undivided.

I. Legs reddish. Posterior eyes equidistant . . . VIGILAX Bl.

II. Legs bright orange yellow. Posterior central eyes nearer to each other than to the laterals . . . LUCIDA Camb.

### FEMALES.



VULVÆ.

[Figs. A to D viewed from above, fig. E from front].

A.—Sternum without punctate impressions.

I. Profile of cephalothorax, with a slight hollow.

Clypeus equals one-half the facial space, not projecting at lower margin. Falces not protuberant at base. Tibia of first pair of legs incrassate . . . . . PAVITANS Camb.

II. Profile of cephalothorax with a deeper hollow.

Clypeus higher and projecting at lower margin. Falces protuberant at base. Tibia of first pair of legs not incrassate . . . . . PUDENS Camb.

B.—Sternum with punctate impressions.

I. Impressions distinct and deep, covering the whole surface of the sternum. Vulva fig. B. . . . . UNICORNIS Camb.

II. Impressions much less distinct and shallow, the centre of sternum being nearly clear . . .

(a) Posterior eyes equidistant.

(i) Eyes fairly large. Posterior central eyes not more than one diameter apart. Vulva, fig. A. . . . . CUSPIDATA Bl.

(ii.) Eyes smaller. Posterior central eyes  $1\frac{1}{2}$  diameters apart. Vulva, fig. D. . . . . VIGILAX Bl.

(b) Posterior central eyes closer to each other than to laterals of same row. Eyes rather small

(i.) Larger. Posterior central eyes fully 1 diameter apart. Vulva, fig. C. . . . . KOCHII Camb.

(ii.) Smaller and slenderer. Posterior central eyes less than 1 diameter apart. Vulva, fig. E. . . . . KARPINSKII Camb.

Figures of *Cornicularia lucida* Camb. ♂, Plate XXXV., fig. 27, and of *C. pavitans* and *C. pudens* Camb. females, Plate XLVI., figs. 13 and 15, may be found in Vol. XXVIII. of 'The Transactions of the Linnean Society.'



## REFERENCES TO PLATE XVII.

Drawings by F. P. Smith.

- FIG. 1.—*C. Kochii* Camb. Ocular tubercle and eyes viewed in profile.  
 FIG. 2.—*C. kochii* Camb. The same viewed from above.  
 FIG. 3.—*C. kochii* Camb. The same viewed from front.  
 FIG. 4.—*C. kochii* Camb. Tibial joint and apophysis from above.  
*a*—tooth of inner limb; *b*—branch of the outer limb.  
 FIG. 5.—*C. kochii* Camb. Part of the left palp viewed from the outside. *a*—C-shaped process at base, and *b*—the circular spine at the extremity of the palpal organs; *c*—another view of the tibial joint and apophysis.  
 FIG. 6.—*C. unicornis* Camb. Tibial joint and apophysis from above.  
*a*—tooth of inner limb.  
 FIG. 7.—*C. unicornis* Camb. Ocular tubercle and eyes viewed from front.  
 FIG. 8.—*C. karpinskii* Camb. Tibial joint and apophysis viewed from above.  
 FIG. 9.—*C. karpinskii* Camb. Ocular tubercle and eyes viewed from front<sup>+</sup>

## REFERENCES TO VULVÆ.

W. Falconer.

- A.—*C. cuspidata* Bl.      B.—*C. unicornis* Camb.      C.—*C. kochii* Camb.  
 D.—*C. vigilax* Bl.      E.—*C. karpinskii* Camb.

**Memorials of Old Lancashire.** Edited by **Lt.-Col. Fishwick** and **Rev. P. H. Ditchfield.** Bemrose & Sons, Derby. 2 volumes, 280 and 314 pp., 25/- net.

It would be difficult to find a greater contrast than between the Lancashire, so charmingly described in these beautiful volumes, and the Lancashire one sees from the railway carriage windows whilst travelling through that county to-day. But the difference is due to the fact that the books deal with *old* Lancashire; and also to the circumstance that in walking through these old fields, we have as guides such well-known and well-informed antiquaries as Col. Fishwick and the Rev. Ditchfield. Both these gentlemen have made the past history of Lancashire their special study; and are consequently the best qualified of editors. They have also written a good share of the chapters. Amongst many other contributors we notice the names of Dr. J. C. Cox, Prof. Collingwood, and Mr. Aymer Vallance.

We can quite understand that in dealing with a county like Lancashire, it was impossible to confine the matter to a single volume, as is the case with most of this series. The marvel is that so much has been included in these two. Col. Fishwick leads off with 'Historic Lancashire'; this is followed by a concise and carefully-written account of 'The Romans in Lancashire', in which are figured the well-known bronze helmet and gold fibula found at Ribchester. Now that the Roman occupation of the county is to the fore, this summary is especially opportune. Cartmel Priory, the Old Church of Manchester, Lancashire Legends, Castles and Fortified Houses, Old Wigan, Furness Abbey, The Crosses of Lancashire, Heysham, Roods, Screens and Lofts, Ancient Fonts, etc., etc., are some of the subjects dealt with in the thirty odd chapters. The value of the volumes is considerably increased by the wealth of carefully-chosen illustrations, and there is a good index. The books are well printed on good paper, and are nice to handle—a yearly rarer feature with books of this character.

## PROCEEDINGS OF PROVINCIAL SCIENTIFIC SOCIETIES.

The **Transactions of the East Riding Antiquarian Society**, Vol. XV., have just been published. It includes a lengthy and valuable paper by Dr. C. Cox on 'A Poll Tax of the East Riding'; Col. P. Saltmarsh writes on 'Some Howdenshire Villages'; the Rev. A. N. Cooper tells 'How Rowley in Yorkshire lost its Population in the Seventeenth Century, and how Rowley in Massachusetts was Founded,' and Mr. Sheppard contributes *Local Archaeological Notes*, with illustrations. **The Bradford Antiquary**, N.S., Part XII., contains 'The Forgotten Manor of Exley,' by Mr. W. A. Brigg; 'The Laycocks of the Parish of Kildwick,' by Messrs. J. A. and J. B. Laycock, 'West Riding Cartulary,' by Mr. C. A. Federer, and several shorter items of local interest.

In the **Transactions of the Leicester Literary and Philosophical Society** (Vol. XIII., part 1) are two papers of special interest to our readers, viz., 'The Cryptogamic Flora of Leicestershire,' by Mr. A. R. Horwood, a valuable compilation; and 'Desert Formations with Reference to the Origin of the Trias,' by the late Joseph Lomas. This paper is the last contribution by that gifted worker, and was delivered by him whilst on his way from Liverpool to Algeria, the news of his death being received only a week after he was at Leicester.

The **Memoirs and Proceedings of the Manchester Literary and Philosophical Society** (Vol. LIII., part 2) contains several papers of great interest. Prof. A. Schwartz and Sir Hugh R. Beevor write on 'The Dawn of Human Intention: an experimental and comparative study of Eoliths,' in which they make out a good case for the artificial origin of these objects; Mr. J. W. Jackson describes the pre-historic implements found in Irish Diatomaceous Deposits; Prof. Weiss refers to the submerged vegetation of Lake Windermere as affecting the feeding-ground of fish, and also writes on 'The Occurrence and Distribution of some alien Aquatic Plants in the Reddish Canal'; and Mr. F. Stubbs contributes some interesting notes on 'The Use of Wind by Migrating Birds.'

**Transactions of the Carlisle Natural History Society**, Vol. I., 1909, 150 pp.

We should like to congratulate the Carlisle Society upon its first publication. It is ideal, and might well be held up as a model to other societies issuing Transactions. All the papers it contains are strikingly local in character; all are useful; there is no 'padding,' and there is evidence of careful and conscientious editing; though the editors' names are not given. A brief 'Introduction' gives a history of the Society. Mr. J. Murray writes a Memoir of T. C. Heysham—'A Bygone Cumberland Naturalist,' and on 'The Land and Freshwater Shells of Cumberland'; Mr. W. E. B. Dunlop contributes some interesting Westmorland Ornithological Notes; Mr. H. Britten writes on 'The Mammals of the Eden Valley'; Mr. T. S. Johnstone contributes part I. of 'Plant Life Around Carlisle'; Mr. T. L. Johnston gives an account of 'The Diving Birds of the Solway'; and Mr. L. E. Hope writes on the Gulls and Wading Birds of the same area. 'The Butterflies of Cumberland' is the title of a paper by Mr. G. B. Routledge, and Mr. F. H. Day writes on 'The Fauna of Cumberland in Relation to its Physical Geography,' and also contributes part I. of 'The Coleoptera of Cumberland.' It is interesting to note (pp 3-4) that 'In 1842, Robert Dunn, of Hull, wrote to Heysham, offering him two skins of the Great Auk for £7 10s. each, and in 1840, Mr. Proctor offered him the egg of the same bird for £3. Unfortunately none of these were secured.' We know nothing about Mr. Proctor, but Mr. Dunn has since died!

The Report of the **Perthshire Natural History Museum** for 1908-9 records the progress made at that institution during the year, and also includes a list of additions, and a valuable Meteorological Report by the Curator, Mr. Alex. M. Rodger.

**Lincolnshire Naturalists' Union Transactions, 1908** [publ. 1909]. Louth, pp. 219-322.

Though there is no indication of this being part of any particular volume, it is evident from the paging that this is a continuation of the publication issued by the Lincolnshire Union, which we are glad to find has more money than it knows what to do with. Personally, however, we would rather have seen the spare funds handed over to the needy and deserving county museum than have seen them wasted in printing papers that were not worth the expense, or which had already previously been printed—in the same Society's Transactions, in fact. That the first volume was not, perhaps, quite up to the standard of the present series has nothing to do with it. The present part opens with a charming portrait of a past president of the Lincolnshire, as well as of the Yorkshire Naturalists' Union, the Rev. Canon W. Fowler; and the photographer seems to have caught him just as he was telling the story about 'Are you drawin' t'cat or am I?' The Rev. F. L. Blathwayt writes some useful 'Notes on the Birds of a Ballast Pit,' and Mr. G. W. Mason contributes part II. of 'Lincolnshire Lepidoptera,' which, together with 'Lincolnshire Coleoptera,' by Rev. A. Thornley and Dr. W. Wallace, are exceedingly valuable contributions to the insect fauna of the county. Mr. W. Denison Roebuck, the President of the Union, gives a valuable 'Census of Lincolnshire Land and Freshwater Mollusca to end of 1908.' Mr. F. M. Burton's paper, though interesting, was read to and published by this same society fifteen years ago. The Rev. A. Hunt's paper, being a Presidential address, presumably *had* to be printed; though if the practice of prefacing papers by lists of pamphlets previously written by an author becomes universal, there will be some interesting developments. There are some shorter notes by other writers. The publication includes 'Field Meetings, 1908,' which (fortunately) are anonymous. A reviewer last year drew attention to the carelessness as regards proof-reading, but, apparently without avail. Not only are the misprints many, but the composition is really shocking.\* In four lines we find '*theolian* sands,' '*hippotamus* and '*rhinocerus*'; '*Cuicus*, '*hederocens*, Low for Sow, etc., etc. 'All these are confined to limited areas and rare.' The Wild Birds' Eggs' Act is apparently not in force in Lincolnshire, as 'Mr. Coward was highly complimented on the splendid work [collecting eggs] he had done, for he had only been *collecting a few seasons*!' 'It formed an interesting exhibit until *they* developed into the *perfect insect*'; 'Mrs. and Alderman Jessop conducted *his* visitors'; '*an* habitat,' etc. At Sleaford 'the Rev. W. W. Mason "*took*" the list of plants'; we hope he's returned it. We were not previously aware that a well-known Leeds conchologist was 'F.G.S.,' and there are some peculiar 'officers,' though they are 'sectional.' Amongst these are 'Boulders,' 'Fungi,' and 'Phœnogamic [*sic*] Secretary.'—R.

We have received the Thirty-second **Annual Report and Proceedings of the Lancashire and Cheshire Entomological Society**. St. Albans, 1909, price 2/-.

Besides the usual rules, list of members, balance sheet and report of the Society's year's work, (which is a very good one), it contains 'A Preliminary Catalogue of the Hemiptera-Homoptera of Lancashire and Cheshire,' by Oscar Whittaker, in connection with which we are glad to see that B. Cooke's list of sixty-four species, printed in 'The Naturalist' for 1882, has proved exceedingly useful. There is also a list of 'Additions to a Preliminary Catalogue of the Hemipetera [*sic*] Heteroptera' of the same area, published in 1907. This includes four species. There is a photograph of Mr. B. H. Crabtree as frontispiece, but we can find no reference to it in the text.

---

\* In fairness to the Hon. Secretary, we should state that he informs us fresh arrangements are to be made next year.—Ed.

**A Tourist's Flora of the West of Ireland**, by **R. Lloyd Praeger**. Dublin : Hodges, Figgis & Co. pp. XII. and 243. With 5 coloured maps, 27 plates and 17 figures in the text. 3/6 net. 1909.

The author tells us that this book is intended to serve as a 'first aid' to the tourist who desires information, in a condensed form, respecting the peculiar flora which to the botanical student renders the West of Ireland one of the most interesting regions in Europe. We know of no one better qualified than Mr. Praeger for the task, and a glance at the three sections into which the book is divided shows how admirably adapted it is to the end in view. The introductory chapters deal with the physical features, vegetational sub-divisions, plant-formations and natural groups, character of the flora, and progress of botanical investigation. Though brief, the many fascinating points in plant distribution are well brought out. The topographical section describes the more interesting features in the flora of over one hundred areas, and are accompanied by many references to local floras, and more detailed works where more complete accounts may be found. This is followed by the systematic section, giving the distribution of each species, the nomenclature followed being that of the 'Cybele Hibernica' and 'Irish Topographical Botany.' The three sections are separately indexed, the indices being easily found by means of coloured title pages preceding sections 2 and 3. The book is beautifully illustrated by the well-known photographs of Mr. R. Welsh, also by five coloured maps, and many small but clear maps in black and white, showing the distribution of the more interesting species. All intelligent tourists, as well as botanists, will welcome this excellent work, and we should like to see the floras of England, Wales and Scotland treated in a similar way.

**Trees: A Hand-book of Forest-botany for the Woodlands and the Laboratory**, by the late **H. Marshall Ward, Sc.D., F.R.S.** Vol. V., Form and Habit. pp. X. and 308, with 209 illustrations. Cambridge University Press, 1909. 4/6 net.

This volume, as in its predecessor, is edited by Dr. Percy Groom, and is a very welcome addition to the series. The first part of the book, including nine chapters, deals with the habit of trees, their stems and branches and branching, also the form, bark and non-typical shoots. The chapter dealing with the development of form will be found particularly interesting to students, and the excellent diagrams help materially to elucidate the text. The chapters on non-typical shoots and climbing plants are equally useful, though the author might possibly have revised a detail here and there had he been spared to see it through the press. The special part deals with the classification of trees according to their shapes, and also with shrubs and bushes. The volume concludes with a classification of trees and shrubs according to their seedlings, which, though not so complete as the author intended to make it, yet will be found most useful, while the drawings of the seedlings are all that could be desired.

---

## NORTHERN NEWS.

Last month we recorded that Scotter Common, Lincs., has been fired. Since then we regret to find that another fine piece of Lincolnshire Common, Crowle Moor, has been destroyed in the same way.

We have received from Dr. W. J. Fordham, of Bubwith, Selby, a photograph of an Ash branch (*Fraxinus excelsior*), showing an interesting example of fasciation. As he points out, fasciation has been of very common occurrence this year. Amongst others noted are flowering stems of *Hypochaeris radicata*, Daisy, Dandelion and other Composites, *Scabiosa columbaria*, *Plantago lanceolata* and *Ranunculus repens*.

Mr. H. H. Corbett has been appointed Curator of the recently formed Municipal Museum at **Doncaster**, at a salary of £50 per annum.

Naturalist,

# THE NATURALIST.

A MONTHLY ILLUSTRATED JOURNAL OF  
NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY

T. SHEPPARD, F.G.S., F.S.A.Scot.,

THE MUSEUM, HULL;

AND

T. W. WOODHEAD, Ph.D., F.L.S.,

TECHNICAL COLLEGE, HUDDERSFIELD.

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF

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## NOTES AND COMMENTS.

### THE CAMBRIDGE NATURAL HISTORY.

We should like to congratulate Dr. Harmer and Mr. A. E. Shipley upon the completion of their monumental work, 'The Cambridge Natural History,' after sixteen years of labour. In all, ten volumes have appeared; the last, though the fourth in proper order, having been delayed by the untimely death of Prof. Weldon. The work has been so carefully planned, and so excellently executed, that it will for many years hold its place as the leading scientific 'Natural History.'

### CRUSTACEA AND ARACHNIDS.\*

Under the above title Messrs. MacMillan have issued the last of the Cambridge volumes. It has been most carefully compiled, and obviously each of the different sections with which it deals has been in the hands of an expert. The illustrations are also numerous and carefully selected. The section devoted to Crustacea has been written by Geoffrey Smith and the late W. F. R. Weldon. Mr. Henry Woods is responsible for 'Trilobites,' and 'Eurypterida'; Mr. Cecil Warburton for 'Scorpions, Spiders, Mites, Ticks, etc.'; Prof. D'Arcy W. Thompson for the Pycnogonida, and Mr. A. E. Shipley for the Pentastomida, the Tardigrada, and for the Introduction to Arachnida and King Crabs.

### THE VOLCANIC ORIGIN OF COAL.

With the above heading we are treated to a pamphlet almost mediæval in its simplicity. It has been written by Col. A. T. Fraser (late R.E.), who has been to Java and seen stratified volcanic material there. This has given him an idea. Why should not coal, marble, and goodness knows what else have been thrown up from a volcano? He says 'that coal should be shewn to be an old volcanic product is of the utmost importance, because it must lead, in spite of opposition only to be expected, to finding that many whole series of strata the world over are after all due to seismic forces, rather than slow aqueous deposition, *thus simplifying the science of geology*. When rocks are seen of which it is difficult to assign the age, having a non-descript character, it would be safe to set them down, at least provisionally, as volcanic.'

---

\* 566 pp. 17/- net.

## MARBLE AS A VOLCANIC ROCK.

We then learn (p. 13), that 'One cannot visit the Italian marble quarries of Carrara without receiving the impression that the marble beds were ejected, accompanied by high-pressure steam, from a fissure, and showered down ; and it is the same with the marble of Mount Parnassus in Greece. The geological peculiarities of Java will therefore well repay careful examination ; and identification of its volcanically-laid strata seems capable of becoming a turning point in geological theory,' etc., etc. This pamphlet has a moral : Keep away from Java !

## BETWEEN PATRINGTON AND EASINGTON : AUGUST.

A white road, stretching far, with margins green  
 Of cool, soft grass, and hedges thin and low,  
 But bright with undergrowth, and the soft glow  
 Of sunfloods pure, enriching the fair scene.  
 A wealth of Bramble-blossom, and the sheen  
 Of frail and painted wings, where light winds blow  
 From the wide Humber's tranquil summer-flow  
 O'er harvest fields, where patient sowers glean.  
 A grace of wild flowers peeping here and there,  
 From the low grass and herbage of the way,  
 Where Nature maketh seeming holiday  
 With bloom and butterfly and leafage fair,  
 But where sweet Purpose, from her dalliance gay  
 Shall seeming loss with teeming wealth repair.

EDWARD LAMPLOUGH.

## GLACIAL AND POST-GLACIAL FEATURES.

In the 'Geographical Journal' for July Mr. G.W. Lamplugh, F.R.S., writes 'Physiographical Notes No. 1,' in which he contrasts the fresh-looking features of the mounds of glaciated areas with the adjacent valleys where obviously considerable erosion has taken place since the Glacial Period. He cites 'the morainic mounds of the Vale of York and of Flamborough Head, and the moundy sands and gravels of Holderness, in their anomalous relation to the huge post-glacial deposits of the Humber and of the Vale of York, and to the erosion-features generally observable where post-glacial streams have traversed drift-covered country. The phenomena of deeply incised



post-glacial valleys associated with glacial features only slightly modified, are, indeed, so common in the north of England that it is needless further to particularise their occurrence.' The explanation given is that the mounds were protected by the snows, whilst the floods formed as the results of thaws quickly cut the valleys and spread fans of gravel on the low ground.

#### COAST CHANGES IN YORKSHIRE.

The Research Department of the Royal Geographical Society is issuing a series of Memoirs on 'Changes on the East Coast Region of England during the Historical Period.' The first of these, dealing with coast changes in East Yorkshire and in the Humber Estuary, by Mr. T. Sheppard, has just been published by the Society in the form of a 'Preliminary Summary Report.' This is divided into sections under the heads of Geological Notes, Lake Dwellings, Historical Evidence, Lost Towns of the Coast, Erosion of the Holderness Coast, Spurn, Hedon, Hull, Lost Towns of the Humber, Ravenser, Erosion in the Humber, New Land in the Estuary, and Thorne Moor and Hatfield Chase.



**Thoughts on Natural Philosophy and the Origin of Life**, written and published by **A. Biddlecombe**. 5th edition. Newcastle-on-Tyne. 39 pp., 1/-.

With this pamphlet the author has kindly sent us a circular, upon which two paragraphs are marked as 'interesting and conclusive.' We think it best to give them as far more likely to draw our readers' attention to the nature of the pamphlet than are any words of our own:—

'One objection that might be made to the compulsory adjacency and collision of the portions of matter is that, if matter had been projected from points along a straight line at sufficient speed, it would have continued so to progress infinitely, without adjacency and collision; and this no doubt is true. But it is only necessary to state the objection for it to be eliminated from the discussion. Matter has now adjacency and collision, therefore as it could not have had it under the supposed conditions of the objection, it is certain that matter has never taken (either originally or at any time) wholly that mode of progression.

'The only other line is the curve, and around any imaginary figure we can draw an imaginary curve, or circle; and for our purpose the curve or curves must permit, if necessary, of infinite extension from the centre to the circumference. It is therefore clear that the portions of matter must have moved (either originally or always) through points in an imaginary circle or circles. The necessity does not exist to bore the reader with long mathematical calculations, the thing is so simple that the calculations and drawings can be made at will. But it is clear that as the portions of matter moved through points in the circle, they must eventually have had adjacency and collision; and as a result spin, and vertical movement and force, followed by gravitation, electricity and magnetism, together with all the natural phenomena with which we are acquainted, including the sensations of heat and light, as the result of material motion.'

## FURTHER PROOFS OF THE FLOW OF THE TRENT ON THE KEUPER ESCARPMENT AT GAINSBOROUGH.

F. M. BURTON, F.L.S., F.G.S.

THAT a river once flowed on the top of the Gainsborough escarpment, which could, to all appearance, have been none other than the Trent, I have shown in 'The Shaping of Lindsey by the Trent.'\* Since the publication of this work I have met with further proofs bearing out and confirming this view.

To make the matter clear it will be well to recall the position and status of the Trent at the time it ran in this old course.

The mean level of the Trent near Gainsborough is about twenty feet above O.D. The Keuper escarpment on the east of the town is eighty feet higher than the river, or about one hundred feet above O.D. When the escarpment was considerably higher than it is at the present time, a subsequent stream of the Humber captured the Trent somewhere about, but considerably higher than the region of Newark, and turned that river from the 'Lincoln Gap,' through which it formerly flowed, into its present course.

At the time of the capture the Trent valley had no existence, but it was carved out at a later period by the Trent, as that river gradually cut through the soft yielding marls of the Keuper on the west, thus leaving the hard Upper Keuper rocks standing out, and forming the present-day escarpment, which runs, with some few breaks in its continuity, from Hardwick Hill on the north, to Newton Cliff, and beyond, on the south.

The land on the summit of the escarpment at Gainsborough rises a little as we proceed eastwards, and attains a height of one hundred and twelve feet above O.D., after which it slopes gradually away to the Lower Lias clays beyond; and on this slope, in a field which has recently been drained, I met with distinct traces of a river bed, exactly like the one I have before described, agreeing with it in all respects, both as to its level and its contents—quartz, quartzites and sandstones—all of which are smoothed and rounded by river action, and imbedded in a matrix of yellowish clay.

The river in this locality probably ran, at the time, in two channels, separated from each other by about seven hundred yards—one on the present brink of the escarpment, and the

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\* See 'The Naturalist,' 1907, p. 261.

other on the east side of the twelve feet elevation—and if so, they may very likely have met again, about a mile away on the south, near Warren Wood, where the land is of a sandy nature, and where I have, on occasions, seen the hedgerows nearly buried with blown sand. The higher land in the midst would thus stand out as an island, possibly drowned at times, when great floods prevailed.

Another confirming proof of the existence of the old Trent bed, connected with the formation of its valley, has lately come to my knowledge. I had often thought it probable that some relics of river-action might be met with on the side of the escarpment at Gainsborough, in the shape of water-worn blocks and fragments of the hard sandstone layers, which occur in this region of the Keuper—though, from the steepness of the slope and the nature of the rock, such traces could only be few—and I have had, recently, the good fortune to meet with some of them. The town cemetery lies at the top of the escarpment, and, in digging a grave lately, some pieces of the sandstone, broken up and rounded, evidently by water action, have been thrown out.

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### ANCHOMENUS VERSUTUS GYLL, A BEETLE NEW TO THE NORTH OF ENGLAND.

J. W. CARTER,  
*Bradford.*

ON July 8th, 1909, during a ramble about Ryehill reservoir, near Wakefield, in company with Mr. Bayford, of Barnsley, I had the pleasure of taking a single specimen of *Anchomenus versutus* Gyll—a species evidently new to the north of England. At first I regarded it as a very dark form of the common *A. parumpunctatus* F., but on a critical examination, I came to the conclusion that it was *A. versutus*, and in this Mr. W. Holland, of the University Museum, Oxford, who kindly examined the specimen, agrees; and writes, '*A. versutus* certainly, and a nice one at that.'

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We notice some Lancashire geologists have been 'working the Lias Chalk.'

In a recent Lancashire angling match 'all fish may be weighed in but Jacksharps and Horse Mussels.'

Mr. C. Crossland, F.L.S., has just issued, for private circulation, a second reprint of his 'Fungus Flora of the Parish of Halifax,' in which the additional records since 1894 have been included.

## HYBRID BETWEEN *ORCHIS MACULATA* AND *HABENARIA CONOPSEA* IN YORKSHIRE.

W. B. ALEXANDER,  
*York.*

ON July 22nd I was gathering some spikes of *Habenaria conopsea* when I noticed one which, in some respects, resembled *Orchis maculata*. Both species were growing in considerable numbers in a small piece of wet ground near the head of Thornton Dale, about six miles from Pickering, where the novelty was obtained. On closer examination I find that it is intermediate in almost every respect:—

(1) The specimen has the scent of *conopsea*.

(2) The spike is more compact than in that species, but less than is usual in *maculata*.

(3) The colour is rosy pink, brighter than that of *conopsea*, about the colour of the darkest type of *maculata*. There are darker red markings on the lip, like those of *maculata*, but not so distinct as usual in that species.

(4) The shape of the flower is decidedly intermediate between the two species, and it is slightly larger than *conopsea* in size. The lip is more divided than in *conopsea*: the wings are broader, and turn more upwards than in that species, but less than in *maculata*. The spur is almost as broad as in *maculata*, but is nearly as long as in *conopsea*, and has a similar curve.

(5) The rostellum is like that of *conopsea*, and does not project as in *maculata*. But the pollinia are like those of *maculata*, and have not the strap-shaped discs of *conopsea*. The pollinia are small and yellow compared with those of either of the supposed parent species, this defect being what might be expected in a hybrid.

On the other hand, the lower ovaries have already increased considerably in size, looking as if they were going to seed properly.

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This hybrid is recorded as British in the last edition of the 'London Catalogue.' It was found in 1898 by Mr. H. Pierson near Sevenoaks (see 'Journal of Botany,' 1899, p. 360), and on the Continent has been named by Camus *Orchis Legrandiana* and *Gymnadiana Legrandiana*.—J. G. BAKER.

## WYCH=ELM SEEDLINGS.

W. P. WINTER,  
*Shipley.*

THIS season has been remarkable for the prevalence of the seedlings of the Wych-Elm (*Ulmus montana* With.). It may, perhaps, be well to place this on record with a note as to some characteristic features of the young plants. The two cotyledons are stalked, fleshy, obovate in outline, with distinct auricles at the base directed downwards. The two pairs of leaves above the cotyledons form with them three decussate pairs, and in this respect the seedlings differ from the description by Tubeuf as translated in Lubbock's 'Seedlings,' where the first leaves are described as alternate. These first two pairs of leaves are shortly stalked, coarsely serrate, with only occasional signs of biserration. They are only slightly asymmetrical, have small stipules at their bases, and both surfaces are rough with hairs, many of which are glandular. Above these leaves the stem becomes more hairy and carries one or two or, more rarely, three small scale-like leaves above the gap between those previously described. Arranged alternately with these is again a similar small set (one, or rarely two). Succeeding to these are leaves in the ordinary leaf-spiral, but not quite so asymmetrical as usual, with stipules of the usual size.

The scale-like leaves certainly suggest modified stipules, and the usual passage from the opposite arrangement of the cotyledons and the two first pairs to the alternate ( $\frac{1}{2}$  divergence) and afterwards to spiral phyllotaxy is noteworthy.

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**The Discovery and Settlement of Port Mackay, Queensland,** by **H. Ling Roth**, Halifax: F. King & Sons. 114 pp.

Mr. Ling Roth is well known to the scientific world for his ethnological researches; and consequently any work from his pen will receive serious attention. In the present case we think he has acted very wisely in placing upon record much valuable information relating to the early history of Port Mackay—information which will be of much greater value each year as time goes on. The author was in Queensland some thirty years ago, and took careful note of the district and its numerous attractions. Since then he has kept a keen watch, recording such items as he thought desirable. The first part of the book contains narratives from the books of early visitors to Queensland, including those of Jukes, the geologist. There is a full account of Capt. Mackay's expedition, and of the settlement of the town and district of Mackay. The closing chapters deal with the ethnology and natural history of the area; the Hymenoptera Aculeata being exceptionally well dealt with. There are nearly one hundred illustrations, including maps and charts.

## THE CROSSBILL MIGRATION.

ON the morning of July 18th an adult female Crossbill was picked up dead under the telegraph wires in King's Road, Ilkley, by my neighbour, Mr. George Priestman, who gave it me to skin. The right wing was broken, and the neck slightly bruised, presumably where it had struck the wire; otherwise the bird was in excellent condition, the body being plump and the plumage very good.—HERBERT WALKER, Ilkley.

Mr. E. C. Houlty, one of our local taxidermists, tells me that when crossing to Hamburg on the 'City of Leeds,' eighty-three miles off Spurn, at 6-5 a.m., August 1st, he saw a young Crossbill come aboard. It seemed fairly tame, and began to eat crumbs. It remained on board until about eleven o'clock.—C. S. CARTER, Louth.

A number of Crossbills came on board a ship off Scarborough the end of June, and seven or eight were caught, and were brought into the Forth. They were seen by my son.—Rev. R. STEAVENSON, Wroxeter.

Small parties of Crossbills were seen near Harrogate in the middle of July. There has evidently been two extensive and distinct immigrations of Crossbills to the British Isles, one at the end of June, and another about the middle of July. As an instance of the great extent of the immigration it is worthy of notice that records were sent from the Orkneys and the Lizard on the same date, and from almost every county on the East Coast, in addition to many visiting ships on the North Sea.

The earlier immigration is noticeable, especially when the fact that Dr. Steward when in Finland in June last, saw parties of Crossbills making their way northward, is considered. In addition to the above records and those which appeared in the August 'Naturalist,' Mr. Boyes in 'The Field,' records a party of a score or so at Beverley, and Mr. Wade, in 'British Birds,' records them at Dalton and Beverley. Mr. St. Quintin told me that they had been seen at Scampston, where they had littered the ground with the green cones of the larch.

Messrs. Boyes and Wade remark upon a fact which is very noticeable, and which has been put on record by many other observers, viz., that the birds had been feeding extensively on Green Fly. There must be many other occurrences in Yorkshire, and observers would do well to forward a record of them to 'The Naturalist.'—R. FORTUNE.

## YORKSHIRE NATURALISTS AT SEDBERGH.

AUGUST Bank-holiday week-end was one of those rare occasions upon which the members of the Yorkshire Naturalists' Union were not favoured with fair weather. With hardly a break the rain fell continuously; and even the hospitality of the White Hart Hotel hardly seemed to atone for the daily walks through the dripping vegetation, the wades through the swollen streams, and the tramps across the bleak fells. The illness of the local secretary, Mr. W. Robinson, was also a serious drawback; but with the guidance of Messrs. Cosmo Johns, E. Hawkesworth and W. Ingham, the counsel of Mr. John Handley, and the exceedingly valuable local help given by Mr. J. M. Iveson, a profitable week-end was spent.

And in the evenings, after dinner, the members got dried, and compared notes. Good discussions also arose as a result of papers by Mr. R. H. Philip on 'The Diatoms of Sedbergh,' and Mr. Cosmo Johns on 'the Nature of the Interior of the Earth.' Another took place in reference to botanical and geological nomenclature.

On the excursions the geologists first proceeded to the Cautley Valley, where the rocks, though greatly faulted and folded, are fairly well exposed, and are accompanied by much volcanic and igneous material. Exposures of lavas and beds of ashes, apparently contemporaneous with the deposition of the Bala limestone, were visited, as was also the splendid section about a mile away, described by Professor McKenny Hughes as the most complete section in the lower beds of the Silurian and the upper beds of the Bala series. Some time was devoted to an examination of the two dissimilar conglomerates at the base of the Carboniferous rocks, as they are rarely found, as here, in near juxtaposition.

Another day was devoted to Douker Gill and Nor Gill. The former exhibits the results of the Dent Fault, and in one place the Coniston Flags abut against the Carboniferous limestone, and almost throughout the whole course of the stream the rocks show the crushing effects of the Fault. In Nor Gill a very interesting section is exposed, showing a great mass of red conglomerate, as to the exact age of which there is some dispute. It has generally been looked upon as the basement bed of the Carboniferous system in England, and in Scotland as of Upper Old Red Sandstone Age. There certainly is a conglomerate

at the base of the Carboniferous rocks in the Sedbergh district, but it varies in several respects from the red one mentioned, and in Nor Gill the relationship of the two is clearly seen. There is no gradual passage from the red deposits to the overlying rocks, and they seem to terminate abruptly, and are succeeded by alternations of grey, or greenish, conglomerate, pebbly limestones, and calcareous shales, the derived material getting gradually less in quantity as a way is made up into the beds of Carboniferous limestone, which here is tilted at a very high angle by the proximity of the Dent Fault.

On the third day the party visited Spen Gill, which exhibits probably the most complete section known of the upper beds of the Bala series and the lower Silurians. Owing to the extremely wet conditions prevailing it was difficult to trace out all the beds, but a good idea of the section was obtained, and numbers of characteristic fossils found. The volcanic rocks of Wandale and Odd Gill were also visited, as was Helm Gill in the Dent Valley, all with satisfactory results.

A section worthy of mention was examined near the Golf Club House. It consisted of a large surface of limestone, grooved and striated, precisely as if by glacial action. Some of the grooves were quite deep. Immediately upon them, however, rested another bed of limestone, under which the striæ extended. It was apparent that the polished and grooved surface was caused by land-slips, the direction of the grooves being down-hill.

The botanists found a rich field, and were well pleased with the abundance of rare and beautiful forms. They investigated Cautley Spout, Howgill, Marthwaite and Killington. For this section Mr. Ingham writes :—

In addition to the FLOWERING PLANTS seen owing to the information kindly given by Mr. John Handley, there are two worthy of notice that came under my own observation.

*Thalictrum montanum* Wallr. is a small and distinct Meadow Rue growing on the rocks well up Cautley Spout. This species is given as growing on Dalton Crag in the 'Flora of West Lancashire.'

*Euphrasia Rostkoviana* Hayne was abundant on the banks of the River Lune. It was a striking Eye-bright with its large size and large flowers. I sent a specimen to Mr. Wheldon, of Liverpool, and he at once named it *E. Rostkoviana*, and gave the following characteristics (1) Corolla lengthens after flowering ;



(2) very large flowers ; (3) tall stem, branched below (4) stem and leaves clothed with a mixture of white bristles and long glandular wavy hairs. In 'The Naturalist,' July 1909, I recorded this same Eyebright from near Warthill Station, five miles from York.

**MOSESSES.** The programme for the excursion gave a good list of mosses found in the Sedbergh district, and in the following notes I propose, with one or two exceptions, to mention additions to those mentioned in the circular.

The most interesting moss found was *Campylopus atrovirens* var. *gracilis* Dixon, growing almost buried in mud by the side of one of the waterfalls in the upper part of Cautley Spout. It was first described as a new variety by Mr. Dixon in the 'Journal of Botany,' 1902, page 374. Its distribution is Merioneth, Carnarvon, Cumberland (Lake District), Forfar, and North Ebudes (Skye), etc. Its occurrence at Cautley Spout makes an addition to the Yorkshire Moss Flora. It is quite distinct from the type in being green above, and brown below ; the type being black below, and in its very long and very narrow leaves with its very narrow, long, toothed, hyaline leaf points. This moss is additional evidence of the Lake District character of the Flora of Cautley Spout. The moss *Breutelia arcuata* grows in the same site.

*Rhabdoweisia denticulata*, specimens of which I have lately received from Mr. C. A. Cheetham and Mr. Albert Wilson from Cautley Spout, I was pleased to locate on the face of vertical rocks near one of the upper falls. The beautiful *Plagiobryum Zierii* was growing close by, and *Grimmia apocarpa* var. *gracilis*.

The three *Andreaeas* mentioned by Mr. Cheetham in the circular were all found on the same rock, and *A. alpina* in fruit. The *A. petrophila* is the var. *flaccida* (teste H. N. Dixon).

*Zygodon Mougeotii* was plentiful at the Spout. *Rhacomitrium fasciculare*, *R. heterostichum* (a broad-leaved form), *Ptychomitrium polyphyllum*, and *Plagiothecium denticulatum* var. *majus* were other mosses there.

On the side of the Spout and near the three *Lycopodiums* was *Campylopus flexuosus*. *Sphagnum papillosum* var. *confertum* in huge bosses was the only Peat Moss seen there. A large form of *Brachythecium plumosum* with very long leaf points grows on the rocks near the water.

**HEPATICS** of Cautley Spout.

*Preissia commutata* in fruit was on the rock ledges.

*Radula complanata*, *Blepharostoma trichophylla*, *Lejeunea cavifolia*, and *Frullania Tamarisci* occurred only sparingly, and mixed with mosses. *Metzgeria conjugata* was found in a large pure patch.

On the moor near Helm Gill were two forms of the Peat Moss, *Sphagnum acutifolium*. In the Gill itself, descended only at one spot for mosses, the most interesting species was *Trichostomum crispulum*. The other records at this spot were *Dichodontium pellucidum*, *Eurhynchium rusciforme*, *E. striatum*, *Hypnum falcatum*, and *Plagiothecium denticulatum*.

*Barbula rigidula* is abundant on the walls by the roadside from Sedbergh to Dent.

The Hepatic *Metzgeria pubescens* was in Flinter's Gill. There were many mosses in this Gill, but during the short visit only the common species were seen.

At the foot of trees on the bank of the River Lune opposite Ingmire Hall, the rare moss *Pterogonium gracile* grows in large tufts.

Sedbergh is a paradise for birds, but the time of year was unfavourable, most of the songsters being silent. Amongst the rare birds nesting in the vicinity are the peregrine falcon, sparrow and kestrel hawks, merlin, buzzard, long-eared, barn, and tawny owls, and occasionally also the short-eared owl. Curlews and golden plovers were found to be abundant on the moors.

At the general meeting held on Monday evening, Mr. Robinson was fortunately well enough to preside. Reports of the work accomplished were given by Messrs. Hartshorn, Ingham, Bairstow, Hawkesworth and Johns. Votes of thanks were passed to the landowners, and also to Messrs. Robinson, Handley and Iveson, for their great help in connection with the excursion.

T. S.

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**The Young Naturalist**, by **W. Percival Westell**. Methuen & Co. 480 pp. 6s.

Uncle Westell has shuffled his cards, added a pack or two, plenty of new 'pictures,' and gone 'nap.' Anyway, 'The Young Naturalist,' which seems to incorporate most of what he has previously written in other volumes, with the addition of numerous really good photographs, and some coloured plates, is the best thing he has done yet, and will doubtless have a large sale. It is certainly a remarkably cheap book, and will be useful to a beginner as it covers almost every branch of natural history. Though there is a slight improvement in this direction, there is still one person Mr. Westell cannot forget in his writings, and that person is Mr. Percival W. Westell.

## A NEW VARIETY OF SEDGE.

P. FOX LEE,  
Dewsbury.

ADDITIONALLY to my discovery this year of the Hairy Sedge in its remarkable prickle-glumed form, *spinosa* Mort., by the canal side at Mirfield; in the early part of July this year I happened to be in the sloping pastures on the eastern bank of the beck of the pretty little valley, couched—a boat-shaped depression—in the bleaker higher land to the south of Woodkirk Church. This is known as the Heybeck.\*

It is within three miles of Dewsbury, and yet it is a beauty spot retaining some of its original ruralness; and it was, indeed, one of the happy hunting-grounds of a former generation of working-men naturalists, who used to visit it for its gay tassels of Dyer's Greenweed, the golden peasebloom sprays of which give the prominent colour note—yellow, with rose-purple of Betony,—to the dryer turf-clothed spoil heaps of pit 'trials' now long ago forgotten.

These, however, make the pastures hereabouts vary vastly in character. In one place a spring of chalybeate water oozing through the soil on the brow will make a quag in which many water-loving plants congregate; though where the seeds come from it is hard to say, and almost as miraculous is it to suppose they have been there in the soil, awaiting a birth-moment for thousands of years; whilst in another, not a hundred yards away, xerophiles such as the pill-headed *Carex* will occur in plenty. As Dr. Lees says, 'the moral for the field-worker is that *all* require searching, missing none, if the full tale, and the secret of "Associations" is to be told.'

Here, then, it was that comparing the constituents of field after field, I came across, in one quite open moss-swampy strip of sloping ground, grazed over, a few clumps of an unusual graceful-looking hair-pedicelled *Carex*, with recurving bright green leaves, and curving pensile spikelets, aggregated from the upper sheath, which was quite new to me, although, of course, its kinship to the wood-lover *sylvatica* was apparent. Clearly on the track of 'a good thing,' for the unknown has ever

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\* Hey—a corruption of Anglo-Sax *hege*—meaning an enclosure, just as beck means a little stream; and no doubt the name was first given when the glebe was enclosed at some period of the kirk's history.

an attraction for the botanist, I had hoped the plant might turn out to be *C. strigosa*—as Dr. Lees tells me, a little-known, much-misnamed species, which is not partial to limestone, and yet the only certain S.W. Yorkshire habitat of which is in shade by the stream at Heptonstall Eaves, where it runs over calcareous Yoredale shale.

The individual catkined shoots were nothing like so robust as *C. sylvatica*, and were moreover growing in the open, associated with *Hypericum quadrangulum*, *Equisetum palustre*, much *Hypnum* moss in matted growth through which grew *Orchis maculata*, *Juncus acutiflorus*, *supinus*, and the Sedges *C. leporina*, *flacca* (glaucous), *hirta* and another. The hedge-wood about includes Alder, Hazel, Wild Cherry, *Acer campestre*, *Viburnum Opulus*, *Salix cinerea* and Sloe, with Dog-rose and *Rosa arvensis*. Some five yards higher up the open wet slope of the pasture, upon my third visit Dr. Lees detected *Lysimachia nemorum*—strong evidence that a wood or thicket, nothing so wet soiled as now (where the collieries and other agents have interfered with natural drainage) once existed, where now cattle are pastured—a district of varied woodland, the very name of which, too, connotes the silvan of some bygone time.

In agreeing to this, Dr. Lees suggests that a fitting name for this extreme, debased (through long interference with normal stresses of growth) form or variety of *Carex sylvatica* Huds., would be *capillariformis*, as in its hair-like spike stalks, in twos or threes from the uppermost sheath it simulates *Carex capillaris*.

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## NOTE ON *CAREX SYLVATICA* var. *CAPILLARIFORMIS*.

F. ARNOLD LEES, M.R.C.S.,  
*Leeds.*

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MR. LEE'S Hey-beck-dale *Carex*, which I have seen *in situ*, adds another spoke to my wheel or thesis of Change—not fixity, even yet—both in Plant Character as in Distribution. As 'Ichabod'—the glory hath departed!—must be written of many a nook and corner of our land once replete with floral and arboreal Treasure valleys, so such constituents as have survived this denudation, or conversion, under long-acting newer conditions not wholly lethal, change too; and in (at least)

their vegetative parts, leaf, flower, stem, etc., adapt their 'characters'—as we call this or that 'feature'—to what best helps their continuing to live. The Hey-beck open marsh *Carex* shews no trace of hybridisation, and in its individual perigynia and the nutlets within is exactly type *C. sylvatica* (Huds.), (elliptic, obscurely veined, with a long cloven smooth beak, and trigonous nut), so that, as with most 'varieties,' the differences which yet make up a strikingly dissimilar facies are in vegetative developments, rather than 'specific' essentials. In proposing for it the style of a *Variety*, its title may not unfitly suggest that *Carex capillaris* L. of Gordale, which the late Prof. Babington placed next to *strigosa* Huds. in his diagnostic arrangement:—*Carex sylvatica* Huds. var. *capillariformis* mihi. ♂ spike one, distinct or part of top catkin; ♀ spike, curved, brief, 7 to 15-flowered, all (except the uppermost) from short sheaths, on very longly exerted capillary pensile pedicels, three to five times the length of spike. Two or three stalks aggregate and spring from the topmost sheath but one (in some cases, not all). The uppermost female spikelet with only 5-7 perigynia and so looking ovate, springs from the same sheath as the male spikelet. Spikelets and glumes of a bronzy green-brown. Habit, tufted from a brief rhizome, Height, 8-12 inches. Frondage of a full yellow-green, outcurving vase-like from tuft, 2 to 3 millimetres in breadth of rough leaf.

The whole plant has a healthy appearance in its seat, virile, hardy, perfecting its fruits abundantly, evidently quite capable of holding its own in competition with pasture grass; but that it is a specialised descendant from a dry woodland slope two hundred, or it may be only a hundred years back, I am convinced; and supported in that by the panning-out presence of the Woodland Loosestrife (now creeping like *L. nummularia* through the wet matt grass). Its immediate associates now have come, I doubt not, with the perhaps recently broken-out spring in the pasture above, much later than the *Carex sylvatica* and *ovalis* and *Lysimachia nemorum*. The grass swamp is a recent one; I looked in vain for *Triglochin*, that surest sign of an old soil regime passing away.



Amongst the additions to the **Grosvenor Museum, Chester**, during the last twelve months, we notice local specimens of the Common Crane, Ruff, Gadwal, skull of *Bos primigenius* and Lesser Shrew.

## SOME NEW YORKSHIRE BEETLES.

T. STAINFORTH,  
Hull.

DURING the past two years I have paid particular attention to the Coleoptera of the East Riding shore of the Humber. Much of the material collected yet awaits examination, but the following notes on the occurrence of some species new to the Yorkshire list which appears in the Victoria County History, may not be without interest.

### HARPALUS ROTUNDICOLLIS Fair.

A single male specimen of this species was found on August 29th last year, under drift at the foot of the embankment on the Humber shore near Hull, between Marfleet Creek and Lord's Clough. Careful examination and comparison with specimens from the south of England proved it to be this species, and my identification has been confirmed by Mr. E. G. Bayford, of Barnsley, and Dr. W. Wallace, of Grimsby. As far as the lists at my disposal show, this is the most northerly record for the species, and Fowler states that he has never 'found it in the north, and that it does not appear in the Yorkshire, Durham and Northumberland, Scotch or Irish lists.'

### BLECHRUS MAURUS Sturm.

This species occurs commonly in the same locality as the preceding, but it makes its habitat under the lumps of chalk on the top of the embankment. They seem to affect the lumps which are embedded in the clay, and on turning such a piece over half-a-dozen specimens have been seen together. They are so active, however, as to be difficult to catch, and if they escape among the crevices between the lumps of rock, capture is well nigh impossible. The species occurs less commonly in a similar situation on Saltend, and I found a single specimen between the grass and the stone capping of a clough on the side of Hedon Haven. The dates of capture were July 28th, August 20th, and October 5th, 1908.

### CÆLAMBUS PARALLELOGRAMMUS Ahr.

On September 20th, 1908, this little water beetle swarmed in the brackish pools on the land side of the embankment on the Humber shore, near the new Joint Dock at Marfleet near Hull. The pools had become very low, and were swarming with beetles, chiefly consisting of this species, *Agabus conspersus*, *Dytiscus marginalis* (some of which were dead or dying), and *Philhydrus maritimus*.

## PHALERIA CADAVERINA F.

On May 30th of this year, whilst turning over some drift seaweed on the sand on the Humber side of Spurn at the Kilnsea end, a single specimen of *Phaleria cadaverina* was secured. In the same locality on June 13th, I discovered another specimen, which the wind carried away as I was about to put it into a tube. Further specimens, however, will probably be found if the drift on the Humber side of the point is examined. This and the next species, *Heliopathes gibbus*, are two good additions to Yorkshire Tenebrionidæ.

## HELIOPATHES GIBBUS F.

On May 25th, 1908, I obtained two, and on June 13th, 1909, one specimen of *Heliopathes gibbus* at Spurn. The first two were found at the roots of grass tufts on the sandhills, and the last example under the seaweed drift on the Humber side of Spurn.



## NEWS FROM THE MAGAZINES.

A strikingly illustrated article on 'The Evolution of the Flower,' by S. L. Bastin, appears in Cassell's *Nature Book*, part 34, recently issued.

A masterly paper on 'Glacial Erosion in North Wales,' by Prof. W. M. Davis, appears in the August *Quarterly Journal of the Geological Society*.

We are glad to find that the *Lancashire Naturalist* has flattered us by imitating many of the features of *The Naturalist*.

'Afforestation as a National Duty' is the title of an instructive paper by Mr. S. Margerison, in the *Land Agents' Record* for March 20th.

Mr. R. Standen describes some varieties of *Dreissensia polymorpha*, with an excellent plate, in the August *Lancashire Naturalist*.

Prof. Patten has a paper on 'The Ornithology of Skerries, Co. Dublin,' in the September *Irish Naturalist*.

In the September *Entomologist's Monthly Magazine* there is an excellent coloured plate upon which are figured *Myrmecoris gracilis*, *Arena octavii*, *Phytosus nigriventris*, *Orochares angustata*, *Stichoglossa semirufa*, *Lomechusa strumosa*, *Lamophlæus monilis*, and *Diastictus vulneratus*.

Mr. Robert Newstead has an interesting paper 'On a recently discovered Section of the Roman Wall at Chester' in Vol. II., No. 2, of the *Annals of Archæology and Anthropology*.

Mr. Richard South writes a note on *Peronea variegana* and aberrations in Durham in the September *Entomologist*.

In the July *Lancashire Naturalist* Mr. W. H. Sutcliffe has an illustrated paper on '*Palæoxyris preidellii* from the well-known Coal Measures at Sparth, Rochdale.'

Mr. S. Duncan noted a Spoonbill on the North Humber shore on Aug. 15th (*British Birds* for September). In the same journal it appears that Kent has again produced a 'new British bird'—nay, new to Europe! This is the Brown Flycatcher, which has 'never before been recorded as occurring west of Chamba, Kashmir.' Whilst it is stated that there are many reasons why this bird is not an 'escape,' we should hesitate to make these frequent additions to the British list on the strength of single specimens.

## ON THE GEOGRAPHICAL DISTRIBUTION OF MOLLUSCA IN SOUTH LONSDALE.

REV. C. E. Y. KENDALL, B.A., J. DAVY DEAN, AND  
W. MUNN RANKIN, M.Sc., B.Sc.

(Continued from page 319).

At present it is impossible to determine the exact distribution of this shell. Evidence that it is locally abundant may be seen from examination of various limestone 'pavements' at Silverdale and Hampsfell (Grange). After heavy rains numbers of dead specimens are washed down from the loose sub-soil above, and may be found in the crevices and on the ledges of the rock below the 'pavements.'

### 2. Coniston Limestone.

*Pupa cylindracea* da Costa. Associated species :—

*Agriolimax agrestis* L.

*Cochlicopa lubrica* Müller.

*Pyramidula rotundata* Müller.

The principal feature connecting this formation with those of the Carboniferous Limestone is the abundant presence of this species. It takes the dominant position on the Coniston Limestone, and is abundant in exposed situations within the 1000 feet zone. The absence of *Pyramidula rupestris* is noteworthy, and the habitual occurrence of *P. rotundata* is important. The association is a non-calcareous one. It is noteworthy that in all its extension across the Lake District no distinctively calcareous plant species, with the possible exception of a few lichens and mosses, may be found on this rock. In Ribblesdale, however, it is somewhat more productive showing a much closer affinity to the Carboniferous Limestone.

### NON-CALCAREOUS PASTURES.

HEATHS (*Calluna* and Grass Heaths). Associations shewing conditions uncongenial to ordinary plant life.

*Limax arborum* Bouchard-Chanteraux. Associated species :

*Agriolimax agrestis* L.

*Pyramidula rotundata* Müller.

*Vitrea alliaria* Miller.

On the heaths this species would appear to be the dominant one, for though 'the Tree Slug,' it is by no means confined to trees. It occurs in the open at Ambleside, and on the higher parts of Coniston Old Man, reaching an altitude of 2600 feet.

Naturalist,



As is usual, apparently, on the more open grounds, the typical form of *L. arborum* is replaced by the darker deeply-banded variety. It is fairly common in the vicinity of moisture, and exhibits the gregarious habit, five or six examples often congregating under one stone. The above species were taken with it at an altitude of about 1000 feet, but occurred only sparingly. *V. alliaria*, a species which seems able to adapt itself to almost any conditions, finds refuge in dry weather under stones in boggy places.

## MARSH LANDS OR WET GRASSLANDS.

## § I. CALCAREOUS LAKES AND PONDS (Hard-water).

OPEN WATER.	REED BELT.	MARSH.
<i>Limnæa pereger</i> Müll.	<i>Physa fontinalis</i> L.	<i>L. truncatula</i> Müll.
<i>Planorbis albus</i> L.	<i>Limnæa palustris</i> Müll.	<i>Aplecta hypnorum</i> L.
<i>Valvata piscinalis</i> Müll.	<i>Planorbis contortus</i> L.	<i>Pisid. pusillum</i> Gmel.
	„ <i>fontanus</i> Lightfoot.	„ <i>obtusale</i> Pf.
	<i>Bithynia tentaculata</i> L.	<i>Carychium minimum</i> M.
	<i>Valvata cristata</i> Müll.	<i>Vertigo pygmæa</i> Drap.
	<i>Pisidium nitidum</i> Jen.	<i>Punctum pygmæum</i>
	„ <i>milius</i> Held.	Drap.
		<i>C. lubrica</i> Müll.
		<i>Vitrea radiatulata</i> Ald.
		„ <i>crystallina</i> Müll.
		<i>Euc. fulvus</i> Müll.

Between Reed Belt and Marsh. Schœnus Belt. (*Schœnus nigricans* L.).

*Succinea elegans*, var. *ochracea* Betta. Associated with *Limnæa truncatula* Müll.

The above are the molluscan fauna associations of a typical calcareous lake. *Neritina fluviatilis* and *Ancylus fluviatilis* are absent, being typical denizens of the non-calcareous rivers.

The former existence of large expanses of water in the district is shewn by the extensive development of lacustrine marls at Burton and Silverdale. The contents of the marls strongly confirm the present associations of the calcareous lakes, and throw some interesting light on former conditions of aquatic life.

HAWES WATER at Silverdale, with its beach of exposed chara-marl, is still the largest sheet of water in the calcareous region. The species of the open water are not numerous. The present *Limnæa pereger* are of the usual lacustrine type, but those in the marl fall into two groups, one lacustrine and the other a form similar to that common to calcareous streams at the present time. *Physa fontinalis* is absent in the marl,

being a species of later date. Of those in the reed-belt *L. palustris* is recent and does not occur in the marl; *Bithynia tentaculata* is abundant, living and in the fossil state; *Planorbis contortus* sparingly fossil and recent.

The following shows the probable grouping of the marl species.

OPEN WATER	REED BELT.	MARSH.
<i>L. pereger</i> Müll.	<i>B. tentaculata</i> L. [foot.	<i>Pisidium pusillum</i>
<i>Planorbis albus</i> L.	<i>Planorbis fontanus</i> Light-	Gmelin
„ <i>crista</i> L.	„ <i>contortus</i> L.	„ <i>obtusale</i> Pf.
<i>Valvata piscinalis</i> Müll.	<i>Valvata cristata</i> Müll.	
	<i>Sphærium corneum</i> L.	
	<i>Pisidium nitidum</i> Jen.	
	„ <i>milium</i> Held.	

There are evidently no river deposits as *Ancylus fluviatilis* and *Neritina fluviatilis* are absent, and the conditions of life when the deposits were laid down would seem to be similar to those obtaining to-day, viz., a deep lake fed by springs, with a shelving shore fringed with reed beds.

Hale Moss is a small patch of a few acres, mostly white with marl and litter, covered by shallow peat, occupying what was the deepest (30 feet) hollow of the ancient Burton Lake. The proportion of shells in the marl here is very much less than in that at Hawes Water. The following species occur in the marl, and may be grouped thus:—

OPEN WATER.	REED BELT.	MARSH.
<i>L. pereger</i> Müll.	<i>Valvata cristata</i> Müll.	<i>L. truncatula</i> Müll.
<i>Valvata piscinalis</i> Müll.	<i>Pisidium nitidum</i> Jen.	<i>Pisid. pusillum</i> Gmelin
	„ <i>cinereum</i> Alder.	„ <i>obtusale</i> Pf.

The noticeable fact here is the absence of the *Planorbis* group and shallow water species—pointing to the existence of a well-filled lake of great dimensions, which has now entirely disappeared.

In the marl deposit, *L. pereger* far exceeds in number all the other species. The shells are not lacustrine in form, but are very similar to those of the Irish marls. In regard to this deposit, Mr. A. S. Kennard says: ‘Judging from your list, the deposit is not a shallow water one, and was laid down in two to three fathoms’ . . . . ‘*Planorbis* is a shallow water form, and not likely to occur in a deep water deposit.’ . . . . ‘*Bithynia tentaculata* is rather a shallow water form, whilst the hall-mark of shallow water is *Limnæa stagnalis* and *Limnæa palustris*.’

As will be seen, *Planorbis* and *Bithynia* are absent, only deep water species being found.

On the present moss occurs—*Succinea elegans* var. *ochracea* Betta., associated sparingly with—

*Vitrea crystallina* Müll.

| *Limnaea truncatula* Müll.

The surface of Hale Moss, as that part of the old lake is called to-day, which is not under cultivation, is well sprinkled with tufts of the rare plant *Schœnus nigricans* L. Between the tufts the marl lies bare without any peat. In wet weather the *Succinea* crawl freely on the surface, and in drier weather burrow beneath the marl, or crawl into the roots of the *Schœnus*. In winter they are to be found in hibernation, securely fixed to the 'rushes' some inches above the base of the stem. This *Succinea* is unlike any other British form. The peculiar extended spire, and the angularity of the last whorl would seem to place it as intermediate between the two species *S. elegans* and *S. oblonga*. It may perhaps be due to xerophilic conditions, marking an advance from an amphibious to a land mollusc.

## § 2. CALCAREOUS RIVERS AND STREAMS.

No good example in the district.

## § 3. NON-CALCAREOUS LAKES AND PONDS (Soft-water).

### 1. Ponds.

OPEN WATER.	REED BELT.	MARSH.
<i>Limnaea pereger</i> Müll.	<i>Sphærium corneum</i> L.	<i>Limnaea truncatula</i> Müll. <i>Planorbis spirorbis</i> Müll. <i>Aplecta hypnorum</i> L. <i>Pisidium pusillum</i> Gmelin. <i>Succinea elegans</i> Risso.

This association is typical of a non-calcareous pond with very little reed belt, and a marshy tract at one end which becomes in summer a dense mass of high grass and sedges.

### 2. Very shallow ponds :—

OPEN WATER.	REED BELT.	MARSH.
<i>Sphærium lacustre</i> Müll.	Nil.	Nil.

Such ponds often become practically dry in summer, only moist clay remaining. *Sph. lacustre*, a species with very closely fitting valves, is well adapted for retaining life even under these conditions, and may be found buried in the dry mud.

## 3. Large Lakes. Example—Lake Windermere.

OPEN WATER.	REED BELT.	MARSH.
<i>Limnæa pereger</i> Müll.	<i>Physa fontinalis</i> L.	<i>Succinea elegans</i> Risso
<i>Planorbis albus</i> L.		—
<i>Ancylus fluviatilis</i> Müll.		<i>Arion subfuscus</i> Drap.
		<i>Agriolimax lævis</i> Müll.
		<i>Zonitoides nitidus</i> Müll.
		<i>Euconulus fulvus</i> Müll.

*Ancylus fluviatilis* occurs principally near the outflow, that is in practically fluviatile waters. *Arion subfuscus* is the dominant species on the lake margin. *Z. nitidus* is typically a non-calcareous marsh species, corresponding to the allied species *Z. excavatus* on drier ground.

In this section also comes :—

*Anodonta cygnea* L., which is characteristic of a non-calcareous lake or pond with a muddy bottom. It is abundant where it does occur, just as in the canal it takes entire possession of the deeper water. No definite association of the habitat can be given; probably it is solitary. It is worthy of note that the largest known specimens (measuring nine inches in length) have been taken from a pond near Garstang.

Sub-section 3a.—SOFT WATER CANALS. (Example—Preston and Kendal Canal).

OPEN WATER.	REED BELT.	MARSH.
<i>Limnæa pereger</i> Müll.	<i>Acroloxus lacustris</i> L.	<i>L. truncatula</i> Müll.
„ <i>auricularia</i> L.	<i>Limnæa palustris</i> Müll.	<i>Pis. pusillum</i> Gmelin.
<i>Planorbis albus</i> L.	<i>Planorbis umbilicatus</i> Müll.	<i>Succinea putris</i> L.
<i>Valvata piscinalis</i> Müll.	„ <i>vortex</i> L.	„ <i>elegans</i> Risso
<i>Anodonta cygnea</i> L.	„ <i>fontanus</i>	<i>Agriolimax agrestis</i> L.
<i>Pisidium amnicum</i> Müll.	Lightfoot.	„ <i>lævis</i> Müll.
<i>Sphærium lacustre</i> Müll.	<i>Physa fontinalis</i> Drap.	<i>Arion ater</i> L.
	<i>Bithynia tentaculata</i> L.	„ <i>hortensis</i> Fér.
	<i>Valvata cristata</i> Müll.	<i>Vitrea crystallina</i> Müll.
	<i>Sphærium corneum</i> L.	„ <i>radiatula</i> Alder.
	<i>Pisidium fontinale</i> Drap.	<i>Z. nitidus</i> Müll.
	„ <i>milius</i> Held.	<i>Euc. fulvus</i> Müll.
		<i>Hygromia granulata</i> Ald.
		„ <i>hispida</i> L.
		<i>Cochlicopa lubrica</i> Müll.

As will be seen and as might be expected, the molluscan fauna places the canal intermediate between non-calcareous lakes and non-calcareous rivers. In the open water section there is a striking abundance of both *Anodonta cygnea* and *Neritina fluviatilis*, the former a species prevailing in the deeper non-calcareous ponds, and the latter typical of slow-flowing

\* An introduced alien.

rivers. *Physa fontinalis*, which comes on the outer margin of the Reed-belt, is very abundant, especially in the late winter and early spring. *Bithynia tentaculata* is perhaps the dominant species following the *Physa* period, while *Limnæa pereger* and *Limnæa auricularia* encroach locally for a short period about May.

There is an abundant molluscan fauna on the grassy margin of the canal, but there is, of course, little in the way of a true marsh. *Succinea elegans* is typical of this habitat, and very abundant, and there are thriving colonies of *Hygromia granulata* and *H. hispida* in the patches of *Potentilla anserina*.

#### § 4. NON-CALCAREOUS RIVERS AND STREAMS.

(All the Rivers, Streams and Becks in the district come under this heading).

##### (a) THE SMALLER STREAMS (Becks).

OPEN WATER.	REED BELT.	MARSH.
<i>Ancylus fluviatilis</i> Müll.	Nil.	<i>Pisidium pusillum</i>
<i>Limnæa pereger</i> Müll.		Gmelin.

The above is characteristic of a swiftly-running beck and the full association is dependent on the gradient. In some of the swiftest reaches of the becks *Ancylus*—the typical mollusc of running water, alone is present, while the *Pisidia* occupy the more muddy shallows of the lower beck.

##### (b) RIVERS (Example—R. Lune).

OPEN WATER. —	REED BELT.	MARSH.
<i>Ancylus fluviatilis</i> Müll.	<i>Physa fontinalis</i> Drap.	?
<i>Limnæa pereger</i> Müll.	<i>Pisidium amnicum</i> Müll.	
„ <i>auricularia</i> L.		
<i>Valvata piscinalis</i> Müll.		
<i>Neritina fluviatilis</i> L.		
<i>Unio margaritifera</i> L.		

The species common to both the lower and upper reaches are *Limnæa pereger*, *Ancylus fluviatilis* and *Neritina fluviatilis*, the latter gradually disappearing towards the source.

(To be continued).



The **Hull** Museum continues to pour out its penny pamphlets. We have recently received No. 59, A 'List of East Yorkshire Spiders, etc.' by T. Stainforth. This includes 177 spiders, 14 phalangidea, and 5 pseudoscorpions. Nos. 60 and 61 are the usual Quarterly Records, the former containing notes on Hull plans, forgeries, skull of fossil Bison, etc., the other including notes on old Hull ships and shipping, the Brigg pre-historic boat, slavery relics, and mediæval antiquities. A further (third) edition has been issued of the Guide to the Albion Street Museum, Hull, and contains much new matter.

## In Memoriam.

THOMAS SOUTHWELL, F.Z.S., M.B.O.U.

(1831-1908).

ALL those interested in natural history, and museum work generally, and particularly those who knew him personally, will regret to learn of the death of Thomas Southwell. He had the kindest of dispositions, and was a delightful companion either in the study or in the field.

It is only a few weeks ago that he spent several days in Kent with the members of the Museums Association. He had just returned from Norway, where he had been recuperating his health after a severe illness. Though as lively and affable as ever, it was not difficult to tell that his age was beginning to shew itself; though few then thought he would leave them so soon.

Thomas Southwell was one of the old-fashioned type of naturalist, and was equally at home with the flowers or insects or birds; though the vertebrates were perhaps his favourites. His writings were always of a useful character; perhaps his best known work being 'Seals and Whales of the British Seas.' He also edited the third volume of Stevenson's 'Birds of Norfolk,' and a new edition of Lubbock's 'Fauna of Norfolk.' The 'Transactions of the Norfolk and Norwich Naturalists' Society,' and the 'Zoologist,' contain a number of articles from his pen; the annual reports on the northern seal and whale fishery appearing in the latter journal, being of particular value. He took a great interest in the Norwich Castle Museum, his Guide to which was exceedingly popular.

He was born at Kings Lynn in 1831, and died at Norwich on the 5th September.

T. S.

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**Round the Lake Country**, by Rev. H. D. Rawnsley. Glasgow: J. Mac-Lehose. 1909. 227 pp., 5/-.

Those who know aught of the Lake District, know of Canon Rawnsley. And those who know Canon Rawnsley well, know the Lake District better for it. He has lost no opportunity of drawing attention to the beauties of that charming area, and in the present work he still further advertises the natural history, archæological and poetic attractions of the lakes. The book is in twelve chapters, and deals with the Coast, the Arnside Lily-woods, the Ravenglass Gullery, the Bewcastle and Gosforth Crosses, Gowbarrow Fell, etc. Each is sympathetically written; the archæological part of the work being perhaps predominant. There are excellent illustrations of famous old crosses, some of the originals of which are surely too valuable to be allowed to remain in the open in all weathers.

Naturalist,

## FIELD NOTES.

### MAMMALS.

**Badgers near Harrogate.**—Badgers are not uncommon in the district surrounding Harrogate, but it is not until recently that they have approached the confines of the town. One was caught early this year at Plumpton in a rabbit trap, he was very thin, and had apparently found difficulty in obtaining sufficient food. Early in July one was captured alive between Beckwithshaw and Rigton, and another one near Plumpton. These occurrences seem to point to the fact that these interesting animals are penetrating into the Crumple Valley, where they have hitherto been unknown, coming probably out of the Tadcaster district. Some years ago 'earths' in the neighbourhood of Allerton and Ribston were re-occupied after having been untenanted for many years. Lord Mowbray informed me that they suddenly appeared in Allerton Park, occupying old 'earths' where they had been unknown for a great number of years.—R. FORTUNE.

**Spotted Otters.**—In connection with the note at the foot of page 308, recording the capture of a speckled otter at Lough Sheelin, Ireland, the following curious entry copied from the Hawkstone Catalogue, written by Harry Shaw in 1848, may be of interest :—"In Scotland the vulgar have an opinion that there is a king among the Otters, spotted with white ; that its skin is endowed with great virtue as an antidote against infection, a preservative of the warrior from wounds, and ensures the mariner from all disasters upon the seas. The Viscount Hill possesses one of these curious skins : the Otter from which it was taken was killed in North Wales." The Hawkstone collection was removed to Peplow Hall (Mr. Beville Stanier's) in 1904, since which date I have examined and catalogued the entire series. The skin is not there now, and seems to have perished years ago. Several specimens had to be destroyed, being in bad condition, but the skin was not amongst these.—H. E. FORREST.

**Black and Brown Rats.**—At the beginning of the present summer, Mr. H. A. Auden kindly sent me several specimens of the old English Black Rat (*Mus rattus*) which had been caught at Widnes, in Lancashire. I kept two of them alive in a home-made cage, and have them yet. On looking into their nest in the middle of August, we found six young ones, about three

weeks old, and of these six, four are of the ordinary black type, and two of the brown *alexandrinus* type. Mr. W. J. Clarke, of Scarborough, tells me that he has on several occasions bred these rats, but has only once succeeded in rearing a litter, and he further informs me that all his young ones were of the ordinary black type. I did not know myself until my rats bred that the two forms were produced in the same litter, and from black parents. I thought that each form, the black *M. rattus*, and the brown, *M. alexandrinus* bred true. Probably all these rats found in this country at the present day are imported specimens which have come off ships. Even when obtained inland, I have traced their presence as due to assistance from the coast, by barges, etc., and I very much doubt whether there be left in the kingdom a pair of the old indigenous English Black Rat, which has disappeared before its more powerful grey congener, save in one or two very isolated districts.—OXLEY GRABHAM.

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### COLEOPTERA.

***Ptilinus pectinicornis* L. at Barnsley.**—Early in July I discovered specimens of this curious beetle emerging from a willow post in my garden, and had the pleasure of observing the habits of the female as she excavated the tunnel in which to lay her eggs. Having enlarged the exit, she then commenced to make the tunnel by working in an upward direction perpendicular to the further extremity of the exit tunnel, which was at right angles to the face of the tree. As the wood fell down in fine frass, it accumulated immediately below where she was working. At intervals she descended backwards, and in that position pushed the frass with her hindmost feet, towards, and ultimately out of the hole. The males emerged a few days before the females, as seems to be the rule amongst internal feeders. It does not appear to have been noted before that the female as compared with the male, apart from the remarkable differences in the antennæ, is almost perfectly cylindrical, the male being depressed on the upper surface, and broader in proportion to the depth between the upper and under surfaces.—E. G. BAYFORD.

***Gracilia minuta* F. in Yorkshire.**—In addition to the records cited in recent communications to 'The Naturalist,' both Barnsley and Doncaster occur in the list of Yorkshire



Beetles in the Victoria County History of Yorkshire. *Leptidea brevipennis* Muls., admitted to the British list by Messrs. Beare and Donisthorpe, on insufficient grounds, I think, has also occurred at Barnsley.

Although I have several times met with *Gracilia minuta* in a free state, on what one might call neutral ground, I have not yet found it in such circumstances that I should feel justified in claiming it as an indigenous species. It has excellent powers of flight, and in bright sunshine, is very lively, reminding one more of a large gnat than a beetle. The mere fact that it has been found some distance away from business premises, is not of itself sufficient to characterise it as indigenous. The only real proof that it is such, is the finding it in one or other of its stages, preferably an immature specimen, still in the pupal chamber.

Similarly, every year specimens of *Sirex gigas* are brought to me, some of them having been taken in country lanes on the outskirts of the town, but there is not the faintest reason for supposing them indigenous to the district. Timber for pit props is in abundance all over the district, and so are fruiterers' hampers, in which *Gracilia minuta* and *Leptidea brevipennis* are imported into the country.—E. G. BAYFORD.

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### MOLLUSCA.

**Colonization of *Helicella virgata* at Hubbard's Hills, Louth.**—In my notes on 'Mollusca of Hubbard's Valley' in 'The Naturalist,' February 1904, I recorded that in the Autumn of 1900, I deposited about half-a-dozen living specimens of *Helicella virgata* on the grassy slope at the south end of the hills, in the hope that a colony might be established. This high bank is on the outcrop of the Lower Chalk, and the predominating plants on the area where the molluscs were deposited are rest-harrow, rock-rose and knapweed. Nothing was seen of the molluscs until the 12th of August, 1902, when one example was found. Four years again elapsed without any record of them. On October 3, 1906, I saw four living and two dead; on February 18, 1907, I found three dead shells; on October 17, 1907, three living ones were seen by Mr. V. Howard. On September 3, 1908, I counted twenty-three living specimens, and on September 19, 1909, I counted fifty-three living on an area about twelve feet square. How many more there might

be, or how far they had extended their range along the bank, I had not time to ascertain, but was satisfied they had become well established.—C. S. CARTER, Louth.

**Arion ater L. as a Wart Curer.**—The *Arion* or Black Slug has from time immemorial been believed to possess great and wonderful healing properties, and its use in various forms are said to have a beneficial effect upon many ailments.

Until comparatively recent times the Slug held a notable place in Medicine, and formerly occupied a place in the *Materia Medica*.

The marvellous faith and belief in its efficacy as a specific for the removal of warts was formerly widely diffused in our own and other countries, and faith in the potency of the remedy probably still lingers in the more secluded rural districts, while the method of using the slug for this purpose being practically similar in widely distant parts, points to a very ancient and common origin of the belief in its efficacy.

The rubbing of the wart with the body of the Slug, described by Mr. Petty,\* has for its basis the belief that the wart and the Slug become thus mutually impregnated with each others nature, so that when the Slug is afterwards securely impaled on a thorn and left to slowly die and waste away, the wart being now, by the mingling of their humours, akin to the dying Slug, is sympathetically affected, and disappears also. It may be added that if the wart does not disappear simultaneously with the desiccation of the body of the Slug, the patient has not placed implicit faith in the remedy, or has failed to observe the necessary secrecy !—JNO. W. TAYLOR.

◆ ◆ ◆

The people of **Maidstone** are to be congratulated upon the excellent museum in their midst, a portion of which is kept in the Chillingham Manor House—a building which is a museum in itself. Mr. Allchin, the Curator, has recently issued an admirable handbook, in which the building and its contents are described and well illustrated (142 pp., 1/-). The collection is particularly rich in geological and archæological treasures, the British, Roman and mediæval relics being unusually representative, as might be expected from so interesting an area as that round Maidstone. The natural history department is also very well described, and includes one of the finest collections of bees in the country ; largely as a result of the efforts of one of the staff. We are glad to see that an improved and enlarged edition of the Guide is promised, and in this the few misprints in the present edition will doubtless be corrected. Amongst these 'Concert,' (p. 119) should be 'Consort ;' and 'Woodcrinus' (plate XI.) should be 'Woodocrinus.' Plate XI., by the way, contains an illustration of an excellent slab of crinoid 'heads' from Richmond, Yorkshire.

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\* 'Naturalist,' August, p. 303.

## REVIEWS AND BOOK NOTICES.

From Messrs. Milner & Co., of Halifax, we have received three volumes of their 'XXth Century Science Series,' which are remarkable alike for their cheapness and the excellence of their contents. Each consists of about 130 pages, is illustrated, and well bound in an attractive red cloth cover. We only hope the volumes will have the circulation they deserve. **Prof. A. C. Haddon** writes on **Races of Man and their Distribution**, the name of the author alone being a guarantee of the excellence and reliability of the matter. This volume forms a summary of the subject such as has been wanted for some time. **Mr. Joseph McCabe**, who is well known for his translations of various foreign works on Evolution, writes on **Evolution : a General Sketch from Nebula to Man**, and deals with the subject in eight chapters, the last being 'A forecast of the end.' **Physiology of the Human Body** is suggested as a text-book for students, and is by that voluminous writer, Dr. Andrew Wilson.

The **Viking Club** continues to issue its valuable publications. Its **Saga Book** (Vol. VI. pt. 1, 161 pp.) just to hand, is of more than usual interest to northern antiquaries. Prof. A. Bugge writes on 'Seafaring and Shipping during the Viking Ages'; some interesting comparisons are drawn between Brunanburh and Vinheið in 'Ingulf's Chronicle and Egil's Saga,' by the Rev. C. W. Whistler; and there are also readable papers on 'The Vikings in Spain,' by J. Stefansson; 'The First Christian Martyr in Russia,' by F. P. Marchant; 'The Sites of three Danish Camps, etc., in East Anglia,' by B. Lowerison; 'A Ship Burial in Brittany,' by P. Du Chatellier and L. Le Pontois, etc., etc. Several of these are illustrated. Parts 11 to 16 of the Club's **Old Lore Series** have also been published, and deal with Orkney, Shetland, Caithness and Sutherland records. Amongst the many items are several curious records of superstitions, witchcraft, fairies, etc., etc. These publications reflect the greatest credit upon the Editor, who has had a difficult task.

A second edition of **Observing and Forecasting the Weather** : Meteorology without Instruments, by **D. W. Horner**, has been issued by Messrs. Witherby & Co. (48 pp., 6d. net). It is an improvement on the first edition, already noticed in these columns; and the illustrations are better.

The **West Riding County Council Vacation Courses** is the title of an attractively prepared pamphlet, issued for the benefit of the teachers attending the County Council Course at Scarborough in August. It contains a number of papers, including 'The Queen of Watering Places,' by Dr. J. Irving; 'A Few Remarks on Botanical Excursions,' by Mr. O. V. Darbishire; 'The Teaching of Science and Domestic Subjects to Girls,' by Prof. A. Smithells, and 'Filey : its Brig and Cliffs,' by Mr. T. Sheppard.

Few volumes have appeared in recent years which have shewn such a wide range of reading and research on the part of their writers, as does **Folk Memory** or the Continuity of British Archaeology, by **W. Johnson**. (Oxford: the Clarendon Press. 416 pp., 10/6 net). And few volumes can be said to possess such a mass of sound scientific deduction as does 'Folk Memory.' *Evolution* is the author's key-note, and in a fascinating way Mr. Johnson shews how in many directions we have survivals of primitive forms. That he is thoroughly up-to-date with regard to his reading is proved by his numerous references to 'Forty Years' Researches,' by Mr. J. R. Mortimer, and to other works of even more recent date. To find fault with any part of the book is difficult; to enumerate the various subjects dealt with is impossible in the space at our disposal, but we can give our readers an idea of the nature of the subjects dealt with by the following hap-hazard selection :—Evolution of stone and bronze implements, of canoes from the old 'dug-outs,' of Tombstones, crosses, burial mounds, garden implements, roads, etc., etc. There are also chapters on dene-holes, dew-ponds, megaliths, flint-knapping, lynchets, incised figures on

the chalk downs, fairies, etc., etc. There is a bibliography which is of the greatest service to students, and a very good index. If the book has a drawback at all, it is that once started, it *must* be read from cover to cover, and for this other work must be neglected! But it's worth it.

**Report on the Scientific Results of the Voyage of the S.Y. 'Scotia'** during the years 1902-4, under the leadership of Dr. W. S. Bruce, Vol. IV., Zoology, Part I. 'Zoological Log,' by D. W. Wilton, J. H. H. Pirie and R. N. R. Brown. Edinburgh: The Scottish Oceanographical Laboratory. 105 pp., plates and maps. 10/6.

This is an elaborately prepared report of a carefully made zoological log kept during the voyage of the 'Scotia.' In the evenings when the party met together, the appointed recorder extracted from the various members the various observations they had made during the day. These were written down on the spot, and too much praise cannot be given to the assiduous way in which the records have been made. In this way mammal, bird, fish, reptile, mollusc and other forms of life are noted and described, and as by far the greater part of the voyage was made in a land little known, amongst animals even more unfamiliar, the scientific value of this log is enormous. This, however, is much increased by the reproduction of over a hundred photographs of antarctic life. The photographs of the birds are perhaps the most striking, the extraordinary attitudes of the penguins being particularly ludicrous. Many of our readers who saw the photographs of the Emperor Penguins, etc., on the occasion of Mr. W. Eagle Clarke's presidential address to the Yorkshire Naturalists' Union, will be interested to know that many of them are reproduced in this report. These alone are worth more than the price asked for the volume. As a frontispiece is an excellent coloured plate of Weddell Seals and Emperor Penguins, and there are also maps shewing the course taken by the ship. We must congratulate Dr. Bruce and his colleagues on the valuable nature of their zoological work, and upon the magnificent manner in which the results of their observations have been given to the world.

**The Vegetation of some Disused Quarries**, by S. Margerison. Gaskarth, Bradford, 52 pp., with 33 illustrations, 1909. 3/-.

The title of this paper, which is reprinted from the Bradford Scientific Journal, 1908 and 1909, suggests to the West Riding botanist a most familiar subject, but one which holds out little of interest; the sub-title, however, is more promising—'The Conquest of New Ground by Plants.' This aspect of plant life has excited considerable interest in recent years, both here and abroad, and has just received a fresh filip by the translation of Ernst's 'New Flora of Krakatau.' An opportunity like the latter rarely occurs, but we have in our limestone screes, cuttings, pit-hills and quarry tips, ample opportunities for studying the problems of invasion and succession, and though the areas mentioned are usually small, it is surprising how similar the processes are in the main.

Commonplace as the subject of the paper at first seems, it is obvious that the author has found for himself a most interesting piece of work, one which has grown in importance as the study has progressed.

The quarries investigated are in Calverley Wood, between Bradford and Leeds, and are along an escarpment in the Millstone Grit series, about a third of a mile long, and consist of rough rock, flagstones and ragstones, with bands of muddy and sandy shales resting on a bed of dark grey shale. The steep slope is planted with trees, probably on the site of primitive forest. It is of the dry oak type, with *Quercus sessiliflora* as the characteristic tree, one of the type very common in this part of the West Riding. The quarries range in age from one hundred years or more, down to some closed so recently as 1905. The method of enquiry was to examine the quarries in detail, and compare the vegetation on the tips and exposed surfaces, according to age. Starting with the youngest, he notes the 'making of the soil' and the organisms—bacteria, moulds, algæ, lichens, mosses and ferns, together with a few phanerogams, chiefly with good wind

dispersal mechanisms—which form the ‘pioneer vegetation,’ and lead on to and prepare the way for a ‘richer soil—humus,’ in which the higher plants become more and more prominent. A suggestive chapter on ‘Soil-gatherers and Soil-binders,’ in which more examples might usefully have been given, paves the way for the consideration of ‘Succession,’ of which three transitional stages are recognised which result eventually in a closed association of hair-grass, bracken, blue-bell and soft grass, with a canopy of oak, birch and sycamore, found in the oldest quarries. ‘So is the vegetation gaining upon our own local raw stones; multitudes of germs have perished, but the work goes on. The kindly green clothing, from stain of alga or moss protonema to deep verdant shade of woodland gradually envelops all. Individuals live, struggle, and die, but Nature sees to it that the mass of life gains all the time,’ and we can well believe the author found his work ‘intensely interesting—as is all field work.’

The photographs, which are very numerous, are excellent. The map is clear and of a suitable scale, and there are some interesting sketches of ling, showing variation in growth among the quarries; the sections of the leaves, however, are inaccurate.

The reprint before us is consecutively paged, but the reference numbers in the text are to the pages in the journal in which the papers appeared. In such cases it would be better to retain the original page numbers, and if desired, separate numbers could be added at the bottom of each page. These, however, are minor points. Mr. Margerison is to be congratulated on having done an excellent piece of work.

**Before Adam**, by **Jack London**. S. Werner Laurie. 308 pp.

The author of this book has dreamed dreams. He is a freak of heredity; at any rate, he says so. And he tells us of all the wierd things he did when he was on the world once before. ‘With the doing away of one wife Red-Eye proceeded to get another. He decided upon the Singing One. She was the granddaughter of old Marrow Bone, and the daughter of the Hairless One. She was a young thing, greatly given to singing at the mouth of her cave in the twilight, and she had but recently mated with Crooked Leg.’ And so on. They fought. Red-Eye evidently got the Singing One, and the author doesn’t know how many wives since! Then there was Lop Ear, Long Lip, Swift One and Chatterer. But though they were all in the trees and scratched themselves, etc., their narratives do not seem to possess that interest that the author has been able to impart unto other of his writings.

**British Mountaineering**, by **C. E. Benson**. London: George Routledge. 1909, 224 pp., 5/-

The author of this work is evidently an enthusiast, and appears to be at home in ‘chimneying,’ ‘scrambling,’ ‘rambling,’ ‘bouldering,’ etc. The results of his experiences are here given for the benefit of those who dare to follow in his footsteps—and the number of such ‘ramblers’ seems to be on the increase. He also gives advice as to the kind of corkscrew, boots and nails, compasses, maps, screws, etc., to be used, and even gives details of ladies’ wearing apparel necessary on such occasions. Remedies are also given for frost-bite, cuts, hæmorrhage, broken arms, legs, ribs, etc.; for fracture of the skull, and internal injuries. There is a special chapter on the dangers of mountaineering, and in every way the author is enthusiastic in the cause of this *healthy* exercise. There are several photographic illustrations of ‘face climbs,’ ‘difficult cracks,’ ‘tough bits,’ ‘chimneys,’ etc., from which it would appear that the author has been successful in securing snap-shots of enthusiasts in absurd positions in exceedingly dangerous situations. Possibly it is to their credit. Anyway we strongly recommend the book to any who are thinking of spending a holiday in trying to break their necks in scaling difficult rock faces.

**The Greatest Life**, by **Gerald Leighton**, London: Duckworth & Co. 275 pp., 5/- net.

In this work we find Dr. Leighton away from his snakes and lizards,

and dealing with a problem which deals with the origin and development of character. 'The Greatest Life is that which most nearly approaches the highest ideal which has been conceived by human intellect, irrespective of the source of that ideal; and the problem that such a life involves is—How may a man attain to it?' In dealing with the present religious problems, Dr. Leighton points out that 'Man will not for ever be content with the child-treatment in his mental sphere, and indeed his discontent is becoming more and more apparent every day. In all religious systems which permit of individuality of thought, this symptom is prominent. From a thousand pulpits comes the cry that modern education is making men less religious. It is not true. Men were never more religiously inclined than they are to-day, but they are demanding a presentation of religious truth which shall be a living one, and not a fossil. The food supplied is indigestible and insufficiently nourishing. They ask for meat and, at the best, are offered milk. Our systems of religious teaching have not kept pace with the march of human intellect.' The author deals with the Making of a Man; the Development of the Soul; Evolution of Physical Immunity; the Making of a Man's Mind; Mental Immunity; Moral Immunity, etc., etc. There is much in the book to think about.

From the press of Mr. T. Werner Laurie has been issued **Gilbert White and Selborne**, by **H. C. Shelley**. It is by no means a novel subject, but one that is always refreshing. In it the author gives a well-thought-out account of the Man, the Village, and the 'Natural History,' and is successful in making an entertaining narrative, which, though perhaps containing little that is new, is more compact than say Mr. R. Holt-White's 'Life and Letters.' The volume is printed in large type, is well illustrated, and has an artistic cover.

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## MUSEUM NEWS.

We notice from the Sixtieth Annual Report of the **Ipswich Museum** that many important 'Bygones' have recently been added to the collection.

The Shells, Minerals and Butterflies in the **Stockport Museum** have recently been re-arranged, and an Index Catalogue of the Minerals is in preparation.

Mr. C. Davies Sherborn has presented to the Natural History Museum, **South Kensington**, a valuable collection of specimens of the hand-writings of naturalists, consisting of about eight thousand letters and other documents.

We have received part 3 of Vol. I. (pp. 219-355, 10/- net), and Vol. II., part 1 (139 pp., 7/6 net) of the Annals of the **Natal Government Museum**, edited by the Director, Dr. Ernest Warren, and published by Messrs. Adlard & Son, London. Both are well printed and illustrated by several excellent plates. In the former, Mr. G. A. Boulenger describes some Fresh-water fishes, batrachians and reptiles (including new species) from Natal and Zululand, and also writes on *Clarias capensis*. Mr. C. T. Regan describes some fishes from the coasts of Natal, Zululand and Cape Colony, and the Rev. Father Franz Mayer gives a short study on Zulu Music, the word 'Music' being applied to the noise made by the wierd primitive 'instruments' which are illustrated. There is also a charming group of Zulu 'musicians.' The Director has a lengthy and scholarly monograph on Natal coast Hydroids. In the second publication the Rev. A. T. Bryant has a remarkable paper on 'Zulu Medicine and Medicine-Men'; the Director writes on '*Lafæa dispoliens* n. sp., a Hydroid parasite,' and on 'Natal Termites'; and Dr. Broom has some interesting observations on 'the Dentition of *Chrysochloris*,' and on 'the Tritubercular theory,' a subject recently referred to in these columns.

# THE NATURALIST.

A MONTHLY ILLUSTRATED JOURNAL OF  
NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY

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THE MUSEUM, HULL;

AND

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TECHNICAL COLLEGE, HUDDERSFIELD.

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF

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WILLIAM WEST, F.L.S.

RILEY FORTUNE, F.Z.S.

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# YORKSHIRE NATURALISTS' UNION.

## SECTION FOR VERTEBRATE ZOOLOGY.

(President—Riley Fortune, Esq., F.Z.S.)

Two Meetings will be held at the Leeds Institute, Leeds, at 3 p.m. and 6-30 p.m. respectively, on Saturday, November 20th, 1909.

### Business (at the Afternoon Meeting:—

To consider and pass the Sectional Reports for 1909, and to elect Officers for 1910.

To consider and pass the General and the Financial Reports of the Yorkshire Wild Birds' and Eggs' Protection Act's Committee for 1909, and to elect the Officers and Committee for 1910.

The Convener of the Yorkshire Mammals', Amphibians', Reptiles' and Fishes' Committee will read an Interim Report, and will propose the re-election of this Committee.

At the Evening Meeting (6-30 p.m.) the following Papers will be read:—

"Bird-Life at the Zoo," by Mr. Riley Fortune, F.Z.S.; "The Extinct Vertebrates of the East Riding," by Mr. Thos. Sheppard, F.G.S.; and "The Relationship of Food to Migration," by Mr. Rosse Butterfield.

Lantern-slides will be exhibited and described by Mr. Oxley Grabham, M.A., M.B.O.U., Mr. Sydney H. Smith, and others.

Any Member or Associate of the Y.N.U. is invited to attend, and to bring any notes, specimens, lantern-slides, etc., and is requested to bring forward any matters of interest connected with the work of the Section, and to take part in any discussion.

Will Officials of the Affiliated Societies kindly notify their Members.

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## NOW READY.

# Transactions of the Hull Scientific and Field Naturalists' Club.

VOL. IV. PART II. PRICE 2/- NET.

### CONTENTS:—

Notes on a Collection of Roman, etc., Antiquities from South Ferriby in North Lincolnshire. Part II. (Plates II., III., IV., V., VI., VII. and VIII). Thomas Sheppard, F.G.S., F.S.A. Scot.

Additions to the Diatomaceæ of the Hull District. R. H. Philip. (Plate IX.).

Catalogue of the Specimens in the 'Lether' Collection and of the Cornbrash Fossils in the Hull Museum. T. Sheppard, F.G.S., and H. C. Drake, F.G.S.

On a Specimen of *Eryon antiquus* Broderip from the Yorkshire Lias.

T. Sheppard, F.G.S.

Fungi in East Yorkshire in 1908. Wilfrid Robinson, B.Sc.

Palæontology in East Yorkshire, etc., in 1908. H. C. Drake, F.G.S.

List of East Yorkshire Spiders, Harvestmen and Pseudoscorpions, etc.

T. Stainforth.

East Yorkshire Botanical Notes. J. Fraser Robinson.

Additional Localities for the Flora of the East Riding. J. J. Marshall.

The Committee's Report on the Work of the Club during 1907-8.

SHORT NOTES:—Note on Mollusca, J. W. Boulton; Some North Lincolnshire Spiders, T. Stainforth; A Tribute to W. R. Bromby, E.L.

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## NOTES AND COMMENTS.

### NON-GLACIAL STRIÆ.

The accompanying illustration is from a photograph of an interesting section on the Sedbergh golf-course, which was examined by the members of the Yorkshire Naturalists' Union on their recent visit to the district. It shows the Silurian grits, polished and striated, as if by glacial action. The striæ, however, continue beneath the bed of rock shown on the right of the photograph, and are evidently caused by a land-slide.



Photo by]

**Grooved Rock, Sedbergh, looking west.**

[Dr. T. R. Burnett.

### MYTILUS CLOACINUS IN THE RHÆTICS.

IN the recently issued 'Proceedings of the Bristol Naturalists' Field Club,' Mr. J. W. Tutchcr gives an interesting account of 'The Strata exposed in constructing the Filton to Avonmouth Railway'; with palæontological notes. In these he describes and figures *Mytilus cloacinus* sp. nov. from the Rhætic bone bed, Aust Cliff. In 1903 Mr. H. C. Drake, F.G.S., spent some time collecting in the bone bed at Aust Cliff, and some of the specimens he obtained are now in the Hull Museum. Amongst them is a *Mytilus*, which we have submitted to Mr. Tucher, who informs us that it is the same as he describes as *cloacinus*.

## A NEW SPECIES.

The following is the description given by Mr. Tutchet :—  
 ‘*Mytilus cloacinus* sp. nov. Anterior outline slightly arcuate, ventral margin rounded, posterior margin gently convex, as far as the hinge line, which is straight, and equals one-third the length of the shell; beak angle, 40 degrees; valves obtusely carinated from the beaks to the antero-ventral border, sloping evenly from the carina to the posterior margin, and sharply on the anterior sides; growth halts well marked. The specimens are generally casts; some fragments of the shell which have been observed do not exhibit any ornament. Dimensions :—length, 42 mm., width, 21 mm., thickness, 12 mm.; geological position, lower Rhætic. The specimen figured is a nearly complete cast from the bone bed at Aust Cliff. Examples have also been collected from the bone beds at Sedbury and at Charlton. This fossil appears to be not uncommon on the bone bed horizon, but, as far as I can discover, it has been found at no other level.’

PROFESSOR P. F. KENDALL.

Our readers will be pleased to hear that a member of the Editorial staff of *The Naturalist* has been selected for the position of President of the Yorkshire Geological Society, which for the past half century had been held by the late Marquis of Ripon. Professor Kendall's excellent work in Yorkshire, as well as the great influence he has personally had in furthering geological study in the county, have been such that his selection as President of the County Society was an easy matter. We only hope that his connection with the Yorkshire Society may be as long as that of the late Marquis of Ripon. Professor Kendall was President of the Yorkshire Naturalists' Union a few years ago.

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The Annual Meeting of the Yorkshire Naturalists' Union will be held at Scarborough on Saturday, December 11th.

In the index to 'Bookprices Current' just issued, we find the first entry on page 688 is 'Entomology (continued): Pearson, W. H., Hepaticæ of the British Isles.' One wonders what the position of these insects is from a Cataloguer's point of view.

Sir Thomas H. Holland, K.C.I.E., F.R.S., has been appointed to the Chair of Geology at the University of Manchester, in the place of Prof. W. Boyd Dawkins, who has resigned. Prof. Dawkins served on the Geological Survey between 1861 and 1869, and was appointed curator of the Manchester Museum and lecturer in geology at Owen's College in 1870, and Professor of Geology and Palæontology on the foundation of the Manchester University.

## THYMUS OVATUS IN NORTH YORKSHIRE.

J. G. BAKER, F.R.S., Etc.,  
Kew.

IN a paper which appeared in the 'Journal of Botany' for 1908, page 34, Messrs. Domin and Bruce Jackson distinguished four so-called species of Thyme in Britain, viz., *T. ovatus* Miller; *T. glaber* Miller; *T. præcox* Opiz, and *T. Serpyllum* L.

*T. Serpyllum* is distinguished by its narrow leaves, long trailing shoots, and capitate inflorescence, and is, I believe, the common Thyme of Yorkshire. From this, *T. ovatus* differs by its broader leaves, inflorescence consisting of distinct whorls of flowers, and by the absence of long trailing shoots. Two specimens from North Yorkshire are now before me as I write, one from banks between Sandhutton and Carlton Miniott, near Thirsk, collected by the late Mr. T. J. Foggitt, and a second collected by myself from Kitscrew Wood, near Hovingham. *T. ovatus* Miller is the plant figured as *T. Chamædrys* by Boswell-Syme in the third edition of 'English Botany,' but is not the true *T. Chamædrys* of Fries, which is the same as *T. glaber* of Miller. This *T. glaber* of Miller is reported by Mr. G. C. Druce from Widdy Bank, on the Durham side of the Tees, but I have not seen either this species or *T. præcox* from Yorkshire, though I note that Mr. Druce (Report of the Botanical Exchange Club' for 1908) gives *T. glaber* as a Yorkshire plant. *T. glaber* differs from *T. Serpyllum* by its glabrous stem and broader bright green glabrous leaves and short shoot.

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The Annual Report of the Marine Biological Association of the West of Scotland for 1908 shews that good work is being done at the Millport Station, and that it is being encouraged in a practical way.

Vol. I., No. 1 of the Journal of the Torquay Natural History Society (48 pp.), has recently been issued, and besides the Society's Sixty-fifth Annual Report, contains some original contributions, and some reports of lectures. Some of the latter, particularly those occupying two or three lines, might well have been omitted. We hurriedly turned to the paper with the tempting title, 'Ancient Phœnician Settlements in Cornwall and Devon,' but only to find the subject dismissed in two and a half lines. Possibly there was a reason for this. Amongst the contributors we notice the names of Messrs. A. J. Jukes-Browne, H. J. Lowe, A. R. Hunt, etc. The longest, and perhaps the most useful contribution, is a list of the Diatoms of the Torquay district, and in this we were pleased to notice that the author had to thank a Hull naturalist for help in determining difficult species. It would have been an advantage if the same person had also read the proofs, as misprints are far too frequent. If a little more margin had been allowed to the pages, their appearance would have been improved.

# NORDMANN'S PRATINCOLE IN YORKSHIRE.

## AN ADDITION TO THE COUNTY AVIFAUNA.

R. FORTUNE, F.Z.S.

EARLY in August I heard that a Collared Pratincole had been shot in the North Riding. This species is of sufficiently rare occurrence to make the event worth investigating.

I found that it had been shot in mistake for a Golden Plover, by Mr. W. S. Charlton, of Northallerton, at Reedholme, near Danby Wiske, on August 17th. Mr. Charlton was after duck at the time, and was waiting beside some water in the shelter of a bank, when a flock of Green Plover flew over. The Pratincole was flying with them, and was the only one of its kind.



Photo by]

[R. Fortune, F.Z.S.

**Nordmann's Pratincole (*Glareola melanopectera*).**

Shot near Danby Wiske.

Mr. Charlton was kind enough to allow me to have the bird for photographing, and it was sent on by Mr. Lee, of Thirsk, who stuffed it. Upon arrival I saw that it was not the common Pratincole, and it proved to be a specimen of Nordmann's or Black-winged Pratincole, *Glareola melanopectera*, and the first to be recognised as a Yorkshire specimen.

It differs distinctly from *Glareola pratincola*, in the secondaries not being tipped with white, and in having the under wing coverts and axillaries jet black instead of chestnut. The specimen resembles the figure of the bird of the year in Dresser's 'Birds of Europe,' with the exception of having the dark bridle-like marking round the throat, though this is not nearly so conspicuous as in the adult plumage of *G. pratincola*.

Naturalist,

## A VETERAN 'CLIMMER.'

ON 11th September, Harry Marr, one of the old Bempton climbers, died suddenly at Buckton from heart failure. A son of the soil, born and bred in Bempton, and a typical East Yorkshireman, his speech, manners and gait smacked strongly of the Shakespearian 'Flavour of the saltiness of time,' and all frequenters of the cliff must regret the disappearance of this picturesque figure, one of the few remaining links with a past



[Photo by

Oxley Grabham.]

**Harry Marr and his 'climbing' outfit.**

generation. He was sixty-three years old at the time of his death, and had earned his living from boyhood by working on the land, like most of the climbing fraternity. In appearance he was tall and handsome.

At the age of thirty, not being engaged at the hirings, and consequently having little to do, he joined Ned Hodgson's gang on the Bempton and Speeton Cliffs—that veteran who

taught so many young ideas how to climb—and after a season's apprenticeship with him, went to Londesborough, Senr., completing with his uncle, Rd. Marr, the gang which climbed the cliffs from Cat Nab to Scale Nab, including the famous Dor, the same ground which he had climbed to the end of the 1909 season, and which, had he lived, he would no doubt have continued climbing till he was seventy, for, in spite of increasing age and stiffness, the old man felt as much at ease on the rope as ever. His greatest difficulty seemed to be getting over the edge of the cliff—once on the swing, and he was perfectly at home. The faculty of climbing had, in fact, become ingrained in him, and had he been compelled to roll over the cliff edge, it seems probable that he would have gone on with it, for when twitted by his friends with getting too old for the job, he always cheerfully replied that 'he could climm best of owt.' His life apart from climbing, consisted of the usual routine of an agricultural village, and calls for no comment. It is in the personalty of the man and his climbing experiences that our interest lies.

At sixty-three he was the oldest climber on the cliff, though in length of service at the game, the veteran Ned Hodgson, who gave up some ten years ago, could beat him. When he commenced, climbing was not the serious business that it is now, there being insufficient eggs to make it worth while gathering them every day, and many off days were spent in working on the land. The number of men in each gang was three, as against the present four, and all the cliff was rent free, the men arranging between themselves what ground each gang was to work. No such thing as rent was ever known till the increase of eggs, owing to the protection afforded by the Act of 1880, gave some of the men an incentive to owt the older climbers from part of their ground, and they went to the farmers and offered to pay for the privilege of egg-gathering. The regulation head-gear was a box-shaped top hat, known as a 'mullah,' also fashionable for executions, both processes being intimately connected with the use of the rope. The lowering was done by running the rope over one thigh, not round the waist as now, and the climber must have had much more work, as the lowering man could not have had so much holding power, whilst long hauls were brought up, and only two men were pulling at the top against three now. One man named Coultas used to climb the broken cliff between the Rowlyup and Dor by himself on

a single rope, a thing never dreamt of now. The climbing is getting reduced to an exact science, more gear and more help being used than in the old days, when a man trusted more to his own strength and agility.

The old man possessed an imperturbable good temper, with a quiet dry humour, and a dialect of the past centuries, which made him an entertaining raconteur; and though his narratives were perhaps somewhat overdrawn where the first person singular was concerned, who shall grudge him the enlarged perspective with which old age views its younger exploits? His death removes a notable landmark from the ranks of the climbers.

'Let not ambition mock their useful toil,  
Their homely joys and destiny obscure;  
Nor grandeur hear with a disdainful smile  
The short and simple annals of the poor.'

E. W. W.

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**Consider the Butterflies How they Grow**, by **L. P. Stubbs**. Elliot Stock. 62 pp. Judging from the title of this book, its price, its frequent references to the Holy Scriptures, and the texts written here and there, it is evidently intended as a Sunday School prize, though the 'butterfly' on the cover is surely very different from anything in the heaven above, in the earth beneath, or in the waters under the earth. Mr. Stubbs' narrative of the life of a butterfly is interspersed with poems about the Nettle's lament over a chrysalis, the Nettle's surprise, Butterfly on wing recognises Nettle, Nettle recognising Butterfly in the air, etc., which, however, 'readers of a strictly scientific taste may omit,' as he also may the message to King Hezekiah, King David's sigh, the address of Jehovah to the patriarch, etc.

For a somewhat similar purpose we presume **Nature**, by **J. H. Crawford** (Swan, Sonnenschien & Co., 5/-) has been published. It is illustrated by all sorts and sizes of blocks, and deals with 'Sunlight in Strange Places'; 'The Library and the Press'; 'Atmosphere in the Schools'; 'St. Valentines'; 'Nature's Easter'; 'Madonna of the Pastures'; 'Midsummer Afternoon,' etc., etc. We should also like to congratulate the publishers on possessing the biggest and messiest rubber stamp with 'presentation copy' upon it, that we have seen. It would have looked better if it had not been placed diagonally across the title page, though possibly its size necessitated this.

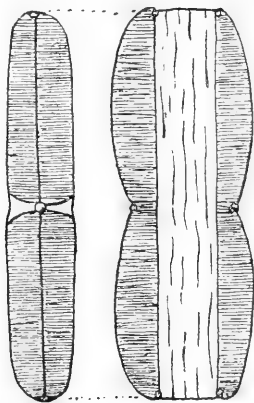
The Manchester University Press has published **Birds Useful and Birds Harmful** (6/-), by **Otto Herman** and **J. A. Owen**, both well-known scientific writers, and not of the talk-about-nothing style, which is becoming so common a feature with ornithological books now-a-days. In its original form the present work was prepared by Mr. Herman at the request of the Minister for Agriculture in Hungary, for the guidance of farmers, fruit-growers and gardeners. The mass of useful information it contains, however, will appeal to many others besides these; and a perusal of the work will surely do much to prevent the slaughter amongst our useful birds which is continually going on. Would that it were possible to place this book in the hands of every gamekeeper in this country, and make him read it! The volume also has useful chapters on bird structure, bird protection, nesting-boxes, etc.

## INTERESTING DIATOM NEAR HULL.

R. H. PHILIP.

IN the 'List of Diatomaceæ occurring in the neighbourhood of Hull,' published in 1859 by George Norman, appears the following record:—'*Amphiprora constricta* Ehr. Very common in brackish water. Pure near Marfleet, Victoria Dock Timber Pond, Marsh Chapel, Garrison Moat, Dairycoates, under Railway Arch.'

I had frequently sought for this form in the neighbourhood of Marfleet, but without success until early in May this year, when, on the occasion of a visit of the Hull Scientific Club to the excavation now going on for the new dock, I found it in great abundance and pure of any mixture with other species, in water oozing from the face of cuttings and forming pools at the bottom of the excavation.



*Stauronella constricta* Ehr. (Mer.). Syn. *Amphiprora constricta* Ehr.  
*Stauroneis amphoroides* Grun.

This diatom has given a great deal of trouble to the authorities by its anomalous structure, and by three leading diatomists it has been assigned to three distinct genera. Ehrenberg gave it the name of *Amphiprora constricta*, under which it appears in Norman's list. Donkin, who found it on the Northumberland coast, called it *Navicula simulans*, and Grunow describes it as *Stauroneis amphoroides*.

When Mr. F. W. Mills and myself were revising Norman's list, it seemed to us that the last of these names was the most appropriately descriptive, so it appears in the illustrated



'Diatoms of the Hull District' under that title. Since then, however, Mr. C. Mereschowsky has published an interesting paper ('Ann. and Mag. Nat. Hist.', S. 7, Vol. VIII., pp. 424-434, Pl. VIII.), in which he points out that it has features which separate it distinctively from any of the three genera to which it has previously been assigned. He considers that the only proper method of dealing with it is to place it in a genus by itself, and proposes to give it the name of *Stauronella constricta* (Ehr.) Mer.

It is rather curious that, although according to Norman's record it was not at all uncommon in his day in this neighbourhood, it seems to be very little known to some of the leading diatomists of our time. Dr. Van Heurck for instance, who describes it under Donkin's name of *Navicula simulans*, states that he does so only from Donkin's work, never having himself seen any authentic specimen. M. Peragallo also ('Diatomées Marines de France') figures under the name of *Stauroneis constricta* (Ehr.) Sm., a dwarfed and emaciated form, which one can hardly recognise as the same thing as that found at Marfleet, and says, 'I have never seen the large forms of this species recorded for the Ocean and the Arctic Seas. Small forms such as that I have drawn are perhaps special to the warm seas.' It is possible, therefore, that outside of this district, it is something of a rarity, and even here I have only found it once previously (in the Victoria Dock Timber Pond). The Dairycoates and Garrison Moat localities, named by Norman, have long ceased to exist.

The figures in Dr. Smith's 'British Diatomaceæ,' usually so excellent, do not do justice to this species. In the valve view, the sides are made to taper towards the median constriction, which is not the case in any specimen I have seen. In the girdle face aspect, the drawing of two young frustules that have hardly completed self division, gives but a poor idea of the well-developed connecting zone of a mature specimen.



Mr. Wm. Blackstock has presented a good collection of minerals to the Haslingden Museum.

A collection of butterflies, etc., said to be valued at about £2000, has been presented to the Accrington Museum by Mrs. Robertson-Aikman.

From the annual report of the Kings Lynn Museum we learn that amongst the additions are one hundred skulls of Norfolk Birds; a 'Camberwell Beauty,' taken at Hillington in 1884, and several rare moths, including three taken in West Norfolk, which are additions to the British insect fauna.

## ON THE GEOGRAPHICAL DISTRIBUTION OF MOLLUSCA IN SOUTH LONSDALE.

REV. C. E. Y. KENDALL, B.A., J. DAVY DEAN, AND  
W. MUNN RANKIN, M.Sc., B.Sc.

(Continued from page 359).

*Neritina* is a true non-calcareous species, while *Ancylus* occurs in both calcareous and non-calcareous rivers, and can exist in shallower and swifter streams than the former. *L. auricularia* is rare, and is of a small acute form. *Unio margaritifera* is local, but abundant in the deeper pools of the lower river. This interesting species is characteristic of a northern fauna, its range extending from the Conway and Dee throughout the north-western counties into Scotland, right into the Highlands. It is a favourite food of the otter, and seems to abound in rivers where this animal is common.

### (c) THE SMALLER RIVERS (Example—R. Bela.)

OPEN WATER.	REED BELT.	MARSH.
<i>L. pereger</i> Müll.	<i>Planorbis carinatus</i> Müll	?
<i>Neritina fluviatilis</i> L.	<i>Bithynia tentaculata</i> L.	

This is a much slower moving river than the Lune, and shews interesting features. In the reaches examined *Ancylus* was absent. *Limnæa pereger* and *Planorbis carinatus* seem plentiful. The latter is a southern and eastern type, and is only local in the north-western counties. This is the only locality for it in Lonsdale.


NOTE.—We have no records for the marsh section of these non-calcareous streams. Captain Farrar gives the following for the margins of the becks of the Lake District, which note is of interest, and may apply to the examples already taken.

OPEN WATER.	MARSH.
<i>L. pereger</i> Müll.	<i>Agriolimax lævis</i> Müll.
<i>Ancylus fluviatilis</i> Müll.	<i>Hygromia fusca</i> Mont.
	<i>Pupa anglica</i> Fér.

He states that *H. fusca* occurs 'wherever sedges border the swiftly-running becks.' *Pupa anglica* is a moss feeder, and though occurring often in woods, this may be its true position.

### 5. HEATH MOORS.

#### § I.—LOWLAND: Ditches and pools on the mosses.

OPEN WATER.	REED BELT.	MARSH.
<i>Limnæa pereger</i> Müll.	<i>Limnæa palustris</i> Müll.	<i>Planorbis spirorbis</i> L. <i>Pisidium obtusale</i> Pf.  Rarely <i>Aplecta hypnorum</i> .

Naturalist,

All these species are usually somewhat dwarfed in size, and are stained and corroded by the peat. The dominant species is *P. spirorbis*, which is usually very abundant. This species would seem to be restricted to the marshy ends of non-calcareous ponds, which are a dense mass of grass and small water plants, and to peat-drains and marshes. It ranges throughout the country in habitats of this kind. The form prevailing throughout this district is the var. *leucostoma* of Millet.

## § II.—UPLAND.

We have as yet no records of these.

## WOODLANDS.

The woodlands of the district fall into two distinct types—the Ash type, characteristic of the Mountain Limestone, and the Oak-birch type, dominated by *Quercus sessiliflora*, characteristic of the Silurians and Millstone Grit Series.

The former type prevails between the valley bottoms and the pavements on the plateaux of the scar limestone. Below, the soil is damp and deep, and the shade noticeable, above, the soil is shallow and liable to drought, and the shade little better than that of scrub. The lower woods shew an admixture of Oak, the upper scrubs have little high growth, and are constituted of the shrubby associates of the Ash wood of the lower mid-slopes. Woods of this type are the most luxuriant of our British associations, not only in individuals, but also in species. The physical conditions are wholly favourable to an abundant life.

Beech woods are not native to the district, but where substituted in the Ash woods of the deeper and damper soils, show life conditions of a fairly distinct character, which justify a separate consideration.

The Oak-birch type of woodlands is that which prevails over most of the Pennine areas off the Limestone. It includes many wood associations though of a lower grade than is the case with the Ash wood type. In the higher associations there is lacking the variety of the scar woods, while in the dry heathy woods which stand at the bottom of a series of wood associations, the life conditions of soil and exposure are distinctly unfavourable to plant life, except of very specialised character. This poverty is reflected in the molluscan association.

## I.—ASH WOOD FORMATION.

(a) DAMP SECTION : deeper soils of the lower wood.

*Clausilia laminata* Mont. Associated with :—

<i>Arion ater</i> L.	<i>Vitrea crystallina</i> Müll.
<i>Vitrea cellaria</i> Müll.	<i>Euconulus fulvus</i> Müll.
„ <i>nitidula</i> Drap.	<i>Pyramidula rotundata</i> Müll.
„ <i>alliarva</i> Miller.	<i>Helix hortensis</i> Müll.
„ <i>radiatula</i> Ald.	<i>Ena obscura</i> Müll.

This handsome species with a reputed partiality for the Beech and Ash, is characteristic of the bottom woods of the purer Ash. In such localities it is abundant under the large moss-covered stones or among the fallen branches and twigs.

*Vertigo pusilla* Müll. Associated species :—

<i>Vitrina pellucida</i> Müll.	<i>Cochlicopa lubrica</i> Müll.
<i>Vitrea alliarva</i> Miller.	<i>Pupa cylindracea</i> da Costa.
<i>Euconulus fulvus</i> Müll.	<i>Vertigo substriata</i> Jeff (rare).
<i>Pyramidula rupestris</i> Drap.	„ <i>alpestris</i> Alder.
<i>Hygromia rufescens</i> Penn.	<i>Clausilia laminata</i> Mont.
<i>Vallonia costata</i> Müll.	„ <i>bidentata</i> Ström.

This species, as evidenced by the association, is marginal to the lower wood, and is found among moss under stones in damp situations, or under top stones of a low crumbling wall, and can be taken in abundance throughout the limestone area. At first sight it would seem that the allied species *V. alpestris* should take its place here, but though often occurring with *V. pusilla* on the borders of Ash woods, its real position is in the damp section of the Oak-birch woods, as will be shewn under that heading. *V. pusilla*, too, is not confined to the north-western counties in the same way that *V. alpestris* is, occurring frequently in the Midlands, and being even recorded for Devonshire.

*Hygromia granulata* Alder. Associated species :—

<i>Vitrina pellucida</i> Müll.	<i>Hygromia rufescens</i> Penn.
<i>Vitrea cellaria</i> Müll.	„ <i>hispidula</i> L.
„ <i>alliarva</i> Miller.	<i>Helicigona arbustorum</i> L.
„ <i>nitidula</i> Drap.	<i>Helix hortensis</i> Müll.

This species again is found on the margins of the Ash-woods, more especially just close to a low Ash or Hazel copse. Its abundance places it at once as one of the locally dominant species. It occurs in large colonies in the patches of *Potentilla anserina*, etc.

## Sub-section—BEECH WOODS.

The noticeable feature of the Beech-woods is the fondness for them of the hispid shells—those which have a more than

ordinarily fibrous epidermis. In this connection the habitat of *H. obvoluta* in the south is of interest, for being of the same nature, it is confined also to Beech woods.

*Acanthinula lamellata* Jeff. Associated species:—

*Vitrina pellucida* Müll.

*Vitrea alliaria* Miller

„ *pura* Ald.

*Euconulus fulvus* Müll.

*Acanthinula aculeata* Müll.

*Carychium minimum* Müll.

*Acicula lineata* Drap.

*A. lamellata*, a Northern type, is extremely local, but dominant over *A. aculeata*, where it does occur. *A. aculeata* belongs really to the Oak-Birch section of the northern district, but is well distributed throughout. The association of *A. lineata* is not always maintained. The association is characteristic of the leaf carpet which, lying in damp soil in the woods, is thickly permeated with fungoid growth.

*Hygromia hispida* L. Associated species:—

*Vitrina pellucida* Müll.

*Vitrea cellaria* Müll.

„ *nitidula* Drap.

„ *pura* Ald.

*Cochlicopa lubrica* Müll.

*Carychium minimum* Müll.

*Hygromia rufescens* Penn.

This species, which is usually of a smaller and more hispid form than the true type, is universally distributed, but occurs in marked abundance among dead beech leaves, especially towards the margin of the woods. We have taken it thus in great abundance, and of a large size in similar habitats in the Midlands, which would seem to strengthen the evidence as to its preference for the Beech. The distribution of this species in the Ash wood of the Carboniferous Limestone is maintained to an altitude of about 400 feet, thus forming a connecting link with the higher and drier woods, the association becoming restricted to *V. nitidula* and *V. pura*.

(b)—DRY SECTION: Shallow soils of the upper woods.

*Clausilia bidentata cravenensis* Taylor. Associated species:

*Pyramidula rupestris* Drap.

*Pupa cylindracea* da Costa.

*Clausilia bidentata* Ström.

*Clausilia laminata* Mont (rare).

*Ena obscura* Müll.

This well-known characteristic Craven shell is found in abundance on the limestone scars sheltering the lower wood. It is not a ground species like *C. laminata*, and is rarely taken on the trees. Unlike *C. bidentata*, it is entirely confined to the Carboniferous Limestone.

## REVIEWS AND BOOK NOTICES.

### NEW BOOKS ON EVOLUTION.

**The Berlin Discussion of the Problem of Evolution**, by **E. Wasmann**. Full report of the Lectures given in February 1907, and of the evening discussion. Kegan Paul, Trench, Trübner & Co. 1909. 266 pp., 6/- net.

They seem to have exciting times in Germany, and in this volume Father Wasmann gives a record of a remarkable discussion which took place in a large crowded hall. A work purporting to be a record of this discussion was published by Dr. Burdinski, but it is alleged this does not give a full and impartial account of Father Wasmann's lectures. Evidently the Catholic priest has had a good hearing, a good criticising, and has given a good reply to his critics. The various remarks of the various professors and others who were on the platform and spoke, are dealt with *seriatim*. In Father Wasmann's opinion, they did not succeed in refuting him, and they provided him with the best possible proof that his opinions, as those of a Christian and a scientist, 'do not clash with the principles of really free research.' Whether the discussions here reported have advanced the study of evolution or not, we must leave our readers to judge for themselves after they have read the book.

**The Making of Species**, by **Douglas Dewar** and **Frank Finn**. London : John Lane. 400 pp. 7/6.

It sometimes happens that 'two great minds think alike,' and evidently one result of such an event is the present book. It is the outcome of conversations which 'we, the joint authors, had last summer . . . One of us took a degree in natural science at Cambridge, and subsequently entered His Majesty's Indian Civil Service, but continued his zoological studies in India as a hobby. The other, a naturalist from childhood, *nevertheless* [!], took a classical degree at Oxford, then received a technical zoological training, adopted zoology as a profession, and held for some years a position in the Natural History Museum at Calcutta.' It might have been added that the initials of one author are D. D., whilst oddly enough, the initials of the other are F. F. With these extraordinary qualifications, our authors decide to give biological science a fresh impetus, as at the present time, 'especially in England, it is in an unhealthy condition.' Their facts and philosophical studies are therefore blended, and the authors modestly affirm 'it is our belief that were Darwin alive to-day, his sympathies would be with us, and not with those who call themselves his followers.' There is no doubt his sympathies would be as the authors imagine ! The theory of natural selection as enunciated by Darwin 'needs considerable modification,' and consequently Messrs. Dewar and Finn have indicated the directions in which the Darwinian theory requires modification. Post-Darwinian books on evolution are divided into four classes, all of which 'are characterised by defects.' Zoological science stands in need of constructive books on evolution ; and the present volume is considered to supply that need. We learn that De Vries, Wallace, Prof. Poulton, and many others are obviously palpably wrong, and as we read on we cannot help humming to ourselves, 'Down with church and down with steeple ; down with parson, down with people ; down with every blessed thing, *but us*.' But our patience is sorely tried when we come to several pages headed 'Kay Robinson's Theory' ; and then we remember having seen various favourable notices of 'The Making of Species' in a certain weekly ! Personally we are sorry we cannot give to this new volume the praise that the authors obviously consider it deserves. Our own humble opinion is that the foundations of the Darwinian theory have not been shaken by a B.A. (Cantab) and a B.A. (Oxon). The publishers have done their work well, though the first word on the first plate is a misprint.

## POPULAR NATURAL HISTORY.

Several volumes dealing with natural history from a popular standpoint have recently reached us. Foremost amongst them are the 3rd and 4th volumes of **The Book of Nature Study** (The Caxton Publishing Co.), the first two of which we have already noticed. Vols. III. and IV. are entirely botanical, well-written on up-to-date lines, and are well illustrated by plates (some coloured) and diagrams. Volume III. is in two sections—the first containing chapters on the life and growth of seedlings, the growth of the shoots from the bud, the growth of plants independently of seeds, and the importance of hairs in plant life, being written by Miss C. L. Laurie. The second section deals with some Common Flowering Plants, contains an Introduction, and chapters on Spring Flowers and Early Summer Flowers, and is by Dr. W. H. Long. In Vol. IV. Dr. Long continues his studies of Common Flowering Plants, and has also chapters on the Scots Pine, and on the arrangement of the plants described in their families or natural orders. Dr. F. Cavers, whose valuable contributions are well known to readers of 'The Naturalist,' writes on 'Ferns and their Relatives, Mosses and Liverworts, the Higher Fungi, Lichens and Moulds, Yeast and Bacteria'; Miss Laurie continues with articles on 'Woodland Vegetation, Plant Associations, and the Vegetations of Commons, Heaths and Moors.' These are all subjects that have been dealt with in this journal from time to time, and we can therefore strongly recommend these volumes to our readers.

Messrs. Cassell & Co. have published a second volume of '**The Nature Book**' (12/-), the first of which we had pleasure in recommending some little time ago. The present is even more interesting than the first of the series, and having regard to the general excellence of the matter, the many illustrations from photographs, and the general appearance of the work, is a very cheap and desirable volume. Every branch of natural history seems to be dealt with. Amongst the contributors we notice the names of Douglas English, F. M. Duncan, J. J. Ward, the late Joseph Lomas, and many others. A charming feature is the number of coloured plates mounted on tinted paper.

Messrs. Gowans & Grey, Glasgow, have sent us Nos. 18, 19 and 20 of their wonderful Sixpenny **Nature Books**, each of which contains sixty beautiful reproductions from photographs, and descriptive letterpress. No. 18 deals with Pond and Stream Life; No. 19, Wild Birds at Home (3rd series), and No. 20, Alpine Plants at Home.

**The Natural History of Selborne**, by Gilbert White, and **The Naturalist on the River Amazons**, by H. W. Bates. Edited by H. B. Browne. Each 96 pp. London: Edward Arnold, 6d.

The Editor of these two little volumes, in his capacity as Senior English Master at Hymers College, Hull, has exceptional opportunity of judging the needs of scholars in our public schools, and has made selections from the two volumes by White and Bates, so as to make the works of value and interest to young readers. By means of footnotes obscure passages are made clear, or supplementary information is given. The books are excellent; we only wish such volumes had been in use at schools twenty years ago!

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**An Ancient Scottish Stronghold: the Story of Dumbarton Castle**, by W. Chambers. Dumbarton: Bennett & Thompson, 74 pp.

As the profits from the sale of this pamphlet are to be devoted to the fund for the establishment of a chair of Scottish History in Glasgow University, it is sincerely to be hoped it has a large sale. A carefully-written account of the castle is given, shewing the various uses to which it has been put from the earliest times; and there is an impartial description of the famous crannog of Dumbuck, though no reference is made to the 'antique' carvings which were then discovered upon modern American 'blue-point' oyster shells.

## PROCEEDINGS OF PROVINCIAL SCIENTIFIC SOCIETIES.

**Transactions of the Yorkshire Naturalists' Union, Part 34, for 1908** [issued 1909]. Hull, A. Brown & Sons. 2/6 net.

This massive volume of some four hundred pages is not perhaps one that will be read straight away from cover to cover; nevertheless it is exceedingly valuable. Fortunately the Union has two sets of publications, its monthly journal taking the notes more generally interesting and requiring more immediate publication. But there are many more lengthy papers, which, whilst not particularly appealing to readers of a monthly magazine, nevertheless require publishing in some form handy for reference. The present part contains the last four annual reports of the Union, in which are set forth the results of work of various departments; a record of which any Society might be justly proud. Mr. C. Crossland then follows with the full lists of species collected on the Maltby and Grassington Fungus Forays; these being supplementary to the recently issued Fungus Flora of the county. Mr. T. Sheppard contributes his bibliography of the geology of the northern counties, for 1902-1908. These lists formerly appeared in *The Naturalist*, but are better in these annual Transactions, as they include the particulars of all the geological papers, books and memoirs issued bearing upon the northern counties of England. It will be understood that they are of value to the student, and it is somewhat complimentary to find that they are used by H.M. Geological Survey. The present compilation contains details of over 1600 references. Following this are reprints of the well-known excursion programmes issued by the Yorkshire Naturalists' Union during the past four years, which contain most valuable natural history records bearing upon all parts of the county.

The **Goole Scientific and Field Naturalists' Society** has issued Vol. I. of its Transactions for 1908-9 (42 pp.), in which we are glad to find that, notwithstanding its meagre membership of thirty-four, there is no lack of enthusiasm, and there are evidently some careful workers. Besides the list of officers, etc., and the Committee's report, there are notes on 'The Flora of Westfield Bank,' by Mr. A. E. Greaves, who also has a note on 'The Flora of the New Railway Embankment and of the Site of the New Dock in Bridge Street,'; Mr. T. G. Kirby writes on 'The Birds of the District,' with notes on unusual visitors by Mr. T. Bunker. Mr. W. Jackson gives 'Notes on some Mycetozoa found in the neighbourhood of Goole'; and reprinted from the 'Goole Times' are 'Some references to the ancient History of Goole and Marshland,' by Mr. L. Holmes, and a 'Visit to Adlingfleet.' If we must grumble, we should like to complain of the small size of the pages (7" x 4½") instead of ordinary 8vo, and if a further publication is issued by the Goole Society, we should like to suggest that it contains a detailed history of the Goole Scientific Societies and their work; say by our old friend Mr. Bunker.

The **Liverpool Botanical Society** is to be congratulated on the uniform excellence of its first volume of Transactions (Liverpool University, 109 pp., 4/-), which has been printed at York. Every contribution is of great value and interest, and we hope that the Society may long continue to do such good work. Prof. R. J. H. Gibson writes on 'A Classification of Fruits on a Physiological Basis'; and on 'The Problem of Photosynthesis,'; Messrs. A. Wilson and J. A. Wheldon describe *Cladonia luteoalba*, a new Lancashire Lichen; *Honkenya peploides*, a Maritime pleiogamous species' is contributed by Mr. F. N. Williams; Messrs. J. A. Wheldon and W. G. Travis give an exhaustive list of South Lancashire Hepatics; Mr. Travis has a useful paper 'On Plant Remains in Peat in the Shirdley Hill Sand at Aintree, S. Lancs.'; Mr. C. T. Green records the occurrence in Britain of an interesting micro-fungus, *Cintractia cingens*. An unusually useful contribution is the Biographical List of Deceased Lancashire Botanists, with a chronological enumeration of their published works and papers. This is by the Editor, Mr. A. H. Dallman, and Miss M. H. Wood.



## THE STUDY OF A FIRCONE.

MRS. E. HUGHES GIBB.

WHAT is a fircone ? and is it worth serious study ?

The first of these questions is carefully answered in the following article ; the second one the reader must answer for himself at the end. In case, however, he may be deterred by the dry look of many figures and diagrams, and may be tempted to guess at a negative, and to drop his enquiry, I will venture here at the beginning to express my belief that anyone who will allow himself to be attracted by the alluring spiral lines of the fircone, and will give a little time and attention to the study of its arrangement, will find himself amply rewarded, nor will he be likely to go away without some new, perhaps even some startling thoughts to which those spirals point the way. One might venture to say that some of the deepest philosophy of life is epitomised within these cones ; but this is no unusual phenomenon in a world in which the infinitely great is so commonly to be discovered hidden within the bosom of the infinitely small.

Every fircone is a strongly compressed spiral, which, through its compression, presents the appearance of a cone with one series of spirals running to the right, and another series to the left. The true spiral which in its coil passes through every scale in the fircone, is invisible, and must be found by calculation.

Physiologically a fircone is a transformed branch, the leaves of which, undertaking a different work from that of the ordinary pine 'needles,' have changed their form to suit their purpose ; and have become hard, woody scales, behind which the winged seeds may safely shelter.\*

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\* One may remark in passing that these transformations of organs to different uses are quite common in the plant world, every coloured petal being, in fact, a leaf altered with a purpose, and many green sepals, or flower-envelopes, being capable of developing brilliant colouring in order to serve as petals when these are lacking, or have been devoted to other uses (*e.g.* in Christmas rose, whose true petals are converted into small green honey pouches), returning to their plain green colour when the need to attract insect visitors is over. The case of the fircone, then, is no unusual one ; and, as in the coloured flower the transformed leaves are compressed into close whorls instead of being distributed along the stem in the usual way, so in the fircone the scales are pressed together as closely as possible.

In studying the general arrangement of leaves upon the stems of plants, botanists have found that, although the fact is so often masked by circumstances that it is by no means patent to ordinary observation, the fundamental principle of leaf arrangement is a spiral form, in which if we count the number of coils made by the spiral round the stem, and the number of leaves it passes through in each complete turn, a series of numbers is shewn, of which any two contiguous ones when

added together will make the next in the series. These are the so-called phyllotaxian numbers, usually written with No. of coils as numerators and No. of leaves as denominators, thus:— $\frac{1}{3}$ ,  $\frac{2}{5}$ ,  $\frac{3}{8}$ ,  $\frac{5}{13}$ ,  $\frac{8}{21}$ , and so on.

In fig. 1 representing six leaves growing up a stem (taken from *Pittosporium undulatum*) the coil, represented by the dotted line, passes through three leaves in its first complete turn, and through two more in its second turn, thus exhibiting

the first two numbers of the above series:— $\frac{1}{3}$ ,  $\frac{2}{5}$ . The sixth leaf stands directly above the first, shewing that for this particular plant the order of the leaf arrangement is completed in five leaves. However long the shoot might be, the positions of those five leaves round the stem would just be repeated over and over again, and as the sixth leaf stood over the first, so would the eleventh, sixteenth, twenty-first, and every fifth leaf onward, the coil passing through three and two leaves alternately in never-ceasing monotony of rhythm. The rose has a similar series of five leaves, and sings to the same simple song of coil and leaf, 3, 2; 3, 2; 3, 2.

A slightly more complicated arrangement is shewn in fig. 2, from the common holly, whose prickly leaves have been cut off in order to shew clearly the arrangement of their growth on

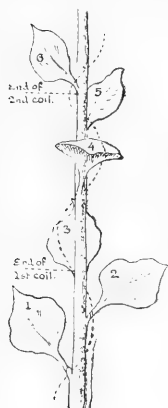


FIG. 1.

From *Pittosporium undulatum*.

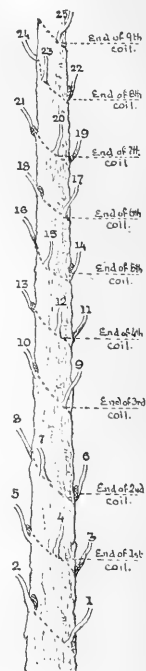


FIG. 2.

From Common Holly.

the stem. Here three coils are made, and eight leaves passed before one (the ninth) is found growing exactly above the first. Carrying the eye up, it will be observed that exactly the same order prevails in every series of eight leaves, the seventeenth and twenty-fifth standing in a direct line above the first, and beginning respectively a new series.

Here instead of the  $\frac{2}{3}$  arrangement we have then the  $\frac{3}{8}$ ; and the regular rhythm of coil and leaf is not 3, 2; 3, 2; as with the *Pittosporium* and the rose, but 3, 3, 2; 3, 3, 2; a simple enough little bird-note still.

These rhythms of the plant world are very fascinating to search out, but they are often by no means easy to discover, as they are masked by many circumstances. Sometimes there is suppression of certain leaf buds which throws out all the series; again there may be suppression of internodes between the leaves, and two leaves which would normally be separated by a space of stem may grow from the same joint in a pair. The common laurel when growing in its usual spreading way with its branches horizontally extended, has adopted the habit of arranging its leaves alternately so that the *third* leaf stands above the first, and the series appears to be completed in one coil passing through *two* leaves. This is very confusing; but if the investigation is pursued it is soon discovered that young sturdyshoots growing *perpendicularly*, have their leaves arranged all round the stem (instead of all facing one way on each side of it), and that now the *sixth* leaf is placed above the first, and the coil runs through three and two leaves alternately, shewing the  $\frac{2}{3}$  arrangement. The reason for the other plan is obviously to obtain full sunshine and air for every leaf on the trailing horizontal branches. If they had kept to their normal manner of growth, certain leaves would have been pointing towards the earth. During the transition from one arrangement to the other, the placing of the leaves is often extremely confusing. This case serves as a good example of the ways in which leaf-arrangement may be modified by circumstances. It is interesting to remark here that upon the numbers which make up the series of leaves as arranged on the stem, depend the numbers of petals and sepals (or transformed leaves) in the flower. Thus the holly, with its sequence of eight leaves, has four sepals and four petals, four stamens and four divisions in its pistil; that is its flower is composed of two leaf-series compressed into four whorls of changed leaves—sepals, petals,

stamens and pistil—for a new purpose. So the flowers of *Pittosporium undulatum* and of the rose have their parts in fives, corresponding with their leaf arrangement in a series of five. Here again, however, it must be remembered that circumstances often change and confuse the issue, and not in every case can the story be easily read.

If an effort be made to find the perfect series of phyllotaxian numbers in the diagram of the common holly, given above, the result will probably be puzzling. In order to do so it is necessary to break into the series of its leaf-arrangement and begin *at the end of the first coil*. Since

the series runs: 3, 3, 2; 3, 3, 2; it will now read 3, 2; 3, 3, 2; 3, 3, 2; and so on; and the coil will pass three leaves in one turn, five in two turns, eight in three turns, thirteen in five turns, and twenty-one in eight turns ( $\frac{1}{3}, \frac{2}{5}, \frac{3}{8}, \frac{5}{13}, \frac{8}{21}$ ).

Now the fircone is built on just the same general principles as these which I have been endeavouring to make clear; only in its case  $\frac{8}{21}$  is the order of its leaves; that is the coil, if pulled out by the yard so as to shew its true formation, would be seen to pass through twenty-one scales in eight coils before one scale would be found growing exactly over the first, and the time of its rhythm is 3, 3, 2, 3, 3, 2, 3, 2; 3, 3, 2, 3, 3, 2, 3, 2; repeated endlessly as with the others.

Looking at the drawing of a fircone (fig. 3), with numbered scales, shewing the order of the hidden spiral which passes through them all, it will be seen that the twenty-second scale stands just above the first, and the compression of the cone is brought forcibly forward by that fact, for within that short space the original spiral has made no fewer than eight coils, passing through twenty-one scales in its way.

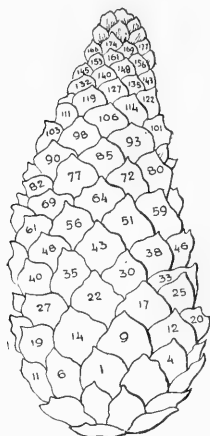


FIG. 3.

Shewing the manner of formation of secondary spirals on a spruce fircone having 8 spirals going to the right and 5 to the left.

(To be continued).

## GENERA AND SPECIES IN FUNGI.

M. C. COOKE, LL.D., M.A., A.L.S., V.M.H. etc.

SOME forty or fifty years ago there was a great outcry amongst botanists of heresy in the camp, and two factions raged against each other. These came to be called 'splitters' and 'lumpers.' The former indulged in an inordinate increase in the number of species in flowering plants—the latter in the delimitation of species to the old lines. The chiefs in these camps were, for the 'splitters' (to a large extent, though not to the full of the fanatics) Professor C. C. Babington, and for the 'lumpers' Dr. Joseph D. Hooker and George Bentham. If I remember rightly, the common Water Ranunculus was proposed to be divided into some ten or a dozen species, and an inconspicuous Crucifer into about sixteen species. In France, especially, the splitters went mad in their scheme of reform. Dr. Hooker, on his return from the Sikkim Himalayas, laughed at this fanaticism, and recommended the advocates to take a few journeys abroad, and examine the floras of other countries, and not attempt to legislate on the strength of their knowledge of local floras, and then they would discover how one species dissolved into another, and how absurd it was to characterize *individuals*, and convert them into species.

This is the head and front of my offending, that I recognize *genera* and *species* as purely artificial groups, constituted by human authorities for the purposes of classification, but that really there are no such things in nature; and in justification of this view, I affirm that it may be discovered that in all genera there are abnormal forms, or intermediate links which do not belong strictly to any genus, but are intermediate, or 'missing links' which join one genus to another, and combine them into one continuous harmonious whole, gliding the one into the other without a gap between, and thus the whole scheme of vegetation is a unity—or, as Dr. Christopher Dresser has intimated, is 'Unity in Variety.'

In Lindley's 'Vegetable Kingdom,' in nearly every natural order, a scheme of affinity is given as in *Malvaceæ*—

Geraniaceæ

Sterculiaceæ — *Malvaceæ* — Byttneriaceæ

Chlænaceæ

showing how *Malvaceæ* is linked with four other natural orders. And the same process might be adopted for all *Genera* and,

indeed, for all species. And if this doctrine is true as regards natural orders, why is it not true of families, genera and species ? Indeed, it may fairly be presumed that if it is true in the one case, it is in the others. I am often deeply grieved that these views did not present themselves to me many years ago, when I had so many facilities for discovering ' missing links ' all over the world, which could not occur within the limits of a local flora.

In the present instance I am only concerned to apply this hypothesis to a single group of Fungi, and that the Hymenomycetes, although I do not doubt in the least of its being applicable all round.

My illustrations will consequently be confined to this single group, which will be sufficient to illustrate my theory.

Of course, as no one's attention has been called to observation in this direction, the illustrations collected will necessarily be few, but they may be largely increased when other observers take to the field. For instance, *Calocera*, with the habit of *Clavaria* and the fructification of *Tremella*, is a missing link, and may be included in Clavariaceæ or in Tremellaceæ without being a good member of either, and may be included in either order with equal justice, according to the will of the author, since it unites the two orders without belonging to either.

Again, *Tremellodon* has the external features of *Hydnum*, but the fruit of *Tremella*, so that again it is an anomaly in the *Hydnaceæ* as well as *Tremellaceæ*, and we may write it thus :—

#### *Hydnaceæ — Tremellaceæ — Clavariaceæ*

So again if we revert to the *Clavariaceæ* we shall find that the exotic genus *Lachnocladium*, which is usually included in the *Thelephoraceæ*, has the habit and appearance of a *Clavaria* with the texture and spores of *Thelephora*, and was included by Fries in *Thelephoraceæ*, but by Saccardo in *Clavariaceæ*, and may be stated thus :—

#### *Thelephoraceæ — Clavariaceæ — Tremellaceæ*

In *Thelephoraceæ* the entire genus of *Cyphella* has the habit and appearance of *Peziza*, but the structure of the *Thelephoraceæ*, and, even in some cases, the fructification when quite mature, passes into that of the *Discomycetes*, so that the genus is a ' missing link ' between the *Hymenomycetes* and the *Discomycetes*.

## Clavariaceæ — Thelephoraceæ — Discomycetes

Again in the Tremellaceæ are such species as *Tremella sarcoides* of Fries which, when fully developed, becomes *Ombrophila sarcoides* with the ascigerous fruit of the Discomycetes, but in the young state, and when undeveloped is only an abnormal Tremella, and is really the link between Tremella and Bulgaria.

In the Dacryomycetaceæ is to be found the little yellow Peziza shaped *Dacryomyces chrysocomus*, which finally is discovered to merge into the genus Calloria, and thus form the link between Dacryomyces and Pezizaceæ.

These examples might be multiplied for all the families of the Hymenomycetes. For instance there is an exotic form of *Dædalea quercina*, which I pointed out to the late Rev. M. J. Berkeley, and with which he agreed that in all essentials it was a *Lenzites*, and thus linked *Dædalea* (Polyporaceæ) with *Lenzites* (Agaricaceæ) although neither a good *Dædalea* nor a good *Lenzites*.

Moreover, there are two or three species of Foreign *Lenzites* which are admitted to be abnormal, and link that genus with *Trametes* (Polyporaceæ) and thus the Agaricaceæ glide imperceptibly into the Polyporaceæ.

We might also indicate in Gasteromycetes a genus *Gyrophragmium*, consisting of a single species, native of Algeria, which forms so close a link with *Coprinus* and *Montagnites* (both of which belong to Agaricaceæ) that it has been called *Montagnites Dunalii*, and also *Agaricus ocreatus*, but it is the link between the Hymenomycetes and the Gasteromycetes, combining features of both natural orders, joining them through *Secotium* and *Polyplodium*, all of which are genera unknown to our local flora.

And now perhaps I may indicate some of those which I consider as 'links' between different genera, which are perhaps even more numerous than those between 'families' and 'natural orders.'

Any one who is acquainted with *Clitocybe* will remember that there is a section called 'Difformes.' Now, it is a patent fact that many of the species in this section approximate so closely to *Tricholoma* that many persons consider it equally entitled to a place as a section of *Tricholoma* to that of *Clitocybe*, and one or two of these species might be selected as veritable links between *Tricholoma* and *Clitocybe*.

Then again, there is the species called by Fries *Pleurotus decorus*, but which has recently been placed in *Tricholoma*, as more fitting, but which is neither a good *Pleurotus* nor a good *Tricholoma*, but which is a good link between the two.

*Lepiota lenticularis* is again so abnormal a species of *Lepiota* that some authors have ventured to transfer it to *Amanita*, where it is equally out of place, and it appears to me that it is one of the links between *Lepiota* and *Amanita*, of which I recognize two or three others.

*Schulzeria* is simply *Lepiota* without a ring, as *Amanitopsis* is *Amanita* without a ring, and but little imagination is necessary to discover connecting links between the ringed and ringless forms.

If we leap to *Mycena* we shall have no great difficulty in discovering links with *Collybia* such as *Collybia psathyroides*, which again suggests a barren *Psathyra*, but beyond this we have links between *Collybia* and *Marasmius*, which are indisputable. Doubtless the original *Collybia cohærens* is better placed in *Marasmius*, but, are not one or two others, if not veritable species of *Marasmius*, at least strong links between the two genera, such as *Coll. stipitaria*.

Then again, such genera as *Amanitopsis*, *Schulzeria*, and *Pilosace*, which only differ from *Amanita*, *Lepiota*, and *Psalliota* by the absence of a ring, and are virtually 'links' rather than genera in themselves.

We cannot fail to observe that *Psalliota cretacea* (Fries) is not by any means a good species, but such as has been termed an 'abnormal' species, and has been attributed to *Lepiota*, to which it is probably the link between that genus and *Psalliota*.

Nor can we forget that several species of smooth spored *Inocybe* are scarce distinguishable from *Cortinarius*. There are one or two species of *Psathyrella* which are manifestly links with *Coprinus*.

The old species *Clitocybe gigantea* (Sow) is now generally recognized as *Paxillus giganteus*, although it is by no means a good species of *Paxillus*, and, to my mind, it is doubtful whether it should be regarded as *Paxillus* at all, but as a 'link' between *Clitocybe* and *Paxillus*.

(To be continued).



## YORKSHIRE NATURALISTS AT CAWTHORNE.

CAWTHORNE, on the outskirts of Barnsley, with its pit shafts and waste heaps, was the rendezvous of the members of the Yorkshire Naturalists' Union on Saturday, August 28th. Notwithstanding the artificial excrescences on the landscape, the district contains much that appeals to the naturalist.

Under the guidance of the Rev. C. T. Pratt and Mr. W. Hemingway, the geologists secured, from the shale heaps, beautiful club-mosses and ferns, so well preserved, that even their most minute structures could be examined. Some new and undescribed forms were obtained. Other sections were under the guidance of Dr. Fryer and Mr. A. Whitaker, and were fortunate in adding new species of coleoptera, mollusca, etc., to the local lists.

After tea a general meeting was held in the rooms of the Barnsley Naturalists' Society, under the presidency of Mr. G. T. Porritt, F.L.S. At this, reports of the day's proceedings were given by Messrs. Whitaker, Broadhead, Cheetham, Hutton, Morley, Lee, and Sheppard. There were representatives from twenty affiliated societies present.

Mr. P. Fox Lee writes :—'The botanists mustered in force and thoroughly enjoyed the pleasant walk, although there was but little of special rarity in flowering plants noted. The flora is a typical Coal Measures one, but in such delightful country, there must surely be in existence many other good species than seem to have been already recorded.

The best finds of the day in Cannon Hall Park and Deffer Wood were *Capnoides* (*Corydalis*) *claviculata* Druce, *Myriophyllum* (sp. ? one of the Water Milfoils, not in flower), *Hydrocotyle vulgaris* L., Agrimony, and *Scirpus setaceus* L. The lake in the Park was quite gay with the blossoms of the yellow water lily and *Sparganium simplex* Huds., with *Nitella opaca* Ag., also in the extensive grounds the Weymouth and Austrian pines with *Picea glauca* (bearing fine 9-inch cones) were flourishing, in the company of huge British timber trees.

Near the old disused canal on the way to Barnsley was a grand display of the tall, erect racemes of *Verbascum Thapsus* L., the great Mullein.

COLEOPTERA.—Mr. E. G. Bayford writes :—'Notwithstanding the beautiful weather, beetles did not appear to be particularly numerous. The following species, mostly common

ones, were met with. No doubt more would have been discovered had not the route been too lengthy for much settled work.

*Notiophilus biguttatus* F.  
*Nebria brevicollis* F.  
*Pterostichus vulgaris* L.  
 „ *striola* F.  
*Anchomenus angusticollis* F.  
 „ *parumpunctatus* F.  
*Bembidium mannerheimi* Sahl.  
*Dromius quadrimaculatus* L.  
*Anacaena globulus* Payk.  
*Megasternum boletophagum* Marsh.  
*Tachinus flavipes* F.

*Tachyporus chrysomelinus* L.  
 „ *hypnorum* F.  
*Platystethus arenarius* Fourc.  
*Anthobium ophthalmicum* Payk.  
*Choleva fusca* Panz.  
*Coccinella decempunctata* L.  
*Epuraea aestiva* L.  
*Antherophagus nigricornis* F.  
*Sinodendron cylindricum* L.  
*Agriotes obscurus* L.  
*Phyllodecta vitellinae* L.

HYMENOPTERA.—In this order the most noticeable and at the same time the most abundant species was without doubt the common wasp (*Vespa vulgaris* L.). An arm of a large tree in Cannon Hall Park, from which the extreme end had been broken, had been utilised for nesting purposes. The whole of the branch, some twelve feet in length, and part of the trunk itself, were fully occupied, and presented a scene of admirable activity. Wherever a little water had been collected in the numerous depressions in the clayey soil, and on the large umbels of the Angelica and Cow Parsley, which in Deffer Wood were fine and extremely abundant, wasps were present in numbers. Since 1893 I have not seen so many in one day's outing. At the same time wasps do not appear to be specially plentiful elsewhere in the Barnsley district. Bombi were also much in evidence, and a specimen of *Odynerus parietum* was observed.

ARACHNIDA.—Mr. Wm. Falconer reports that Mr. W. P. Winter and himself, the only members of the party interested in the Arachnida, found the route followed a most excellent one, leading as it did through an ideal woodland district. Spider-collecting, however, requires much closer application over a more restricted area than they were able to give, owing to the distance traversed, so that only a very imperfect investigation was possible. Search was practically confined to the first portion of the route, time not permitting any work to be done in the Cawthorn Park Wood. Beside the ponds in Cannon Park, *Lycosa amentata* Clerck and two species of *Ædothorax* (*Gongylidium*) *fuscus* Bl. and *retusus* Westr. swarmed, and from beneath the rugged bark of the adjacent sycamore trees, one male *Epeira umbratica* Clerck (new to the West Riding), many examples of *Segestria senoculata* Linn., *Amaurobius fenestralis* Stroem, and a few *Styloctetor penicillatus* Westr. and *Clubiona*

*corticalis* Walck. were obtained. For the last two there are only two other Yorkshire records. From the yews growing by the side of the drive leading into Deffer Wood were beaten a few immature specimens of both sexes of *Epeira sturmi* Hahn. This is the first definite Yorkshire record of this spider. In the wood itself, a wet spot yielded *Bathyphantes approximatus* Camb., one female (new to West Riding); the bracken debris produced *Ædothorax agrestis* Bl., *Tapinocyba pallens* Camb. and *Wideria cucullata* C. L. Koch; and on tree trunks *Drapetisca socialis* Sund. abounded. The best finds of the day however, were an adult pair of *Ceratinella scabrosa* Camb., and a female *Walckenaera*, which has not yet been determined satisfactorily, both new to Yorkshire. Altogether, forty-three species of true spiders, five of harvestmen, and one of pseudo-scorpions were met with. In the following complete list, A denotes species obtained by both, B by Mr. Winter only, and C by himself only.

- |   |  |
|---|--|
| <p>A. <i>Segestria senoculata</i> Linn.<br/> <i>Clubiona corticalis</i> Walck.<br/> <i>Amaurobius fenestralis</i> Stroem.<br/> <i>Drapetisca socialis</i> Sund.<br/> <i>Linyphia triangularis</i> Clerck.<br/> <i>Leptyphantes blackwallii</i> Kulcz.<br/> <i>Bathyphantes variegatus</i> Bl.<br/> <i>Microneta viaria</i> Bl.<br/> <i>Ædothorax fuscus</i> Bl.<br/> <i>Æd. retusus</i> Westr.<br/> <i>Dicymbium nigrum</i> Bl.<br/> <i>Styloctetor penicillatus</i> Westr.<br/> <i>Cornicularia cuspidata</i> Bl.<br/> <i>Pachygnatha degeerii</i> Sund.<br/> <i>P. clerckii</i> Sund.<br/> <i>Meta segmentata</i> Clerck.<br/> <i>Xysticus cristatus</i> Clerck.<br/> <i>Lycosa amentata</i> Clerck.<br/> <i>L. lugubris</i> Walck.<br/> <i>Oligolophus morio</i> Fabr.<br/> <i>O. agrestis</i> Meade<br/> <i>O. palpinalis</i> Herbst.<br/> <i>Obisium muscorum</i> Leach.</p> | <p>B. <i>Epeira umbratica</i> Clerck. (new to W. Riding).<br/> <i>Neon reticulatus</i> Bl.<br/> C. <i>Labulla thoracica</i> Wid.<br/> <i>Leptyphantes terricola</i><br/> C. L. Koch.<br/> <i>Bathyphantes approximata</i><br/> Camb. (new to W. Riding).<br/> <i>B. gracilis</i> Bl.<br/> <i>B. concolor</i> Wid.<br/> <i>Microneta beata</i> Camb.<br/> <i>Sintula diluta</i> Canib.<br/> <i>Ædothorax agrestis</i> Bl.<br/> <i>Lophomma herbigradum</i> Bl.<br/> <i>Diplocephalus picinus</i> Bl.<br/> <i>Tapinocyba pallens</i> Camb.<br/> <i>Walckenaera</i> ♀ ( ? species)<br/> (new to Yorkshire).<br/> <i>Wideria cucullata</i> C. L. Koch.<br/> <i>Ceratinella scabrosa</i> Camb.<br/> (new to Yorkshire).<br/> <i>Epeira sturmi</i> Hahn.<br/> <i>Pirata piraticus</i> Clerck.<br/> <i>Epiblemum scenicum</i> Clerck<br/> (Walls of Cawthorn Museum).<br/> <i>Oligolophus tridens</i> C. L. Koch.<br/> <i>Nemastoma lugubre</i> O. F. Mull.</p> |
| <p>B. <i>Clubiona reclusa</i> Camb.<br/> C. <i>comta</i> C. L. Koch.<br/> <i>Stemonyphantes lineata</i> Linn.<br/> <i>Diplocephalus fuscipes</i> Bl.<br/> <i>Bolyphantes tuteolus</i> Bl.</p>   |  |

CONCHOLOGY.—Mr. J. E. Crowther writes :—‘ This section was officially represented by its President, Mr. W. Harrison Hutton, Messrs. Rushwath and J. E. and T. Crowther. Alighting at Darton station, and proceeding in the direction of Barugh Bridge several species were found on the roadside,

including *Arion intermedius* several species of *Vitria*, *Hygromia hispida*, *Helix hortensis* and *Clausila bidentata*. In the canal at Barugh several fresh-water species were noted, including *Limnaea stagnalis*, *L. auricularia*, *Planorbis carinatus* *P. contortus*, *Valvata piscinalis*, *Bithynia tentaculata* and *Paludestrina jenkinsi*. In a pond near Cawthorne were *Planorbis albus*, with *Pisidium pusillum* and its var. *grandis*.

In the Lake at Cannon Hall Park dead shells of *Limnaea auricularia*, *L. pereger*, *Anodonta cygnaea* and *Unio pictorum* were found ; in one of these a crayfish had made its home.

Deffer and Cawthorne Park Woods proved rather unproductive. *Euconulus fulvus* and *Vitria crystallina* in the former, and *Arion subfuscus* in the latter were all that were noted. On the roadside near Kexbro *Helix hortensis* was found in some variety, *lilacina* being the most notable. The dryness of the weather in some degree accounted for the shortness of the list of land shells. *Paludestrina jenkinsi* was first found by the writer on May 22nd of this year when some members of the section paid a visit to the district. This species was first discovered at Plumstead in 1889 by Mr. A. J. Jenkins, and has since been found in many parts of this country, sometimes (as in the present instance) in incredible numbers. How it is that it suddenly appears in such numbers and in such widely distinct places is one of the problems that has not yet been satisfactorily solved. One suggestion is that it is introduced in timber from the Baltic, which may be very likely in this instance as large numbers of pit props must be imported into the district every year, though this particular part of the canal has not, I believe, been used for traffic for over twenty years, and it seems unlikely to have been overlooked by such energetic conchologists as Wilcox, Hebden and Whitwam, who must have worked the district many times.

Another suggestion is that this species has cycles of abundance, sometimes appearing in large numbers in one year and then in gradually decreasing numbers (as in the Spen Valley instance), till conditions favourable for another revival occur, and that many of the older conchologists either overlooked them altogether, or mistook them for the young of larger species.

The following is a complete list of the mollusca noted during the excursion :—

<i>Limax maximus</i>	<i>Cochlicopa lubrica</i>
<i>Agriolimax agrestis</i>	<i>Clausilia bidentata</i>
<i>Milax sowerbyi</i>	<i>Limnaea auricularia</i>
<i>Vitrina pellucida</i>	„ <i>pereger</i>
<i>Vitria crystallinus</i>	„ <i>stagnalis</i>
„ <i>cellaria</i>	<i>Planorbis albus</i>
„ <i>allaria</i>	„ <i>carinatus</i>
„ <i>nitidula</i>	„ <i>contortus</i>
„ <i>pura</i>	<i>Physa fontinalis</i>
<i>Euconulus julvus</i>	<i>Paludetrina jenkinsi</i>
<i>Arion ater</i>	<i>Bythinia tentaculata</i>
„ <i>subfuscus</i>	<i>Valvata piscinalis</i>
„ <i>intermedius</i>	<i>Unio pictorum</i>
„ <i>hortensis</i>	<i>Anodonta cygnaea</i>
<i>Pyramidula rotundata</i>	<i>Sphærium corneum</i>
<i>Hygromia hispida</i>	„ <i>lacustre</i>
„ <i>rufescens</i>	<i>Pisidium amnicum</i>
<i>Helix hortensis</i>	„ <i>pusillum</i>

Mr. W. Harrison Hutton writes that he found a typical half-grown specimen of *Milax sowerbyi* near the museum at Cawthorne. It was about two inches down, amongst the roots of vegetation—a quite characteristic habitat. T. S.

### HISTORY AND TOPOGRAPHY.

**Liverpool Castle and its Builders**, by C. H. Hand. Liverpool: Hand & Co. 37 pp., 2/6 net.

Having regard to its apparent size, it is astonishing with what rapidity one can read through this little book. But it is printed on one side of thick paper only, in large type, and has a wealth of margin. Still it is none the worse for that, and as it is fortunately lettered on the back (a rare feature in thin books now-a-days) it can be at once detected on the bookshelf. Mr. Hind gives an entertaining account of the vicissitudes of the Castle from the time of King John, points out its present site in Liverpool, gives an illustration of the last remnant of the Castle, and refers to the confusion which has taken place in the past between the 'Castle' and 'Manor House.' He also draws attention to an error in the pageant of 1907—a not very difficult matter, unfortunately!

**York in English History**, by J. L. Brockbank and W. M. Holmes. London: A. Brown & Sons. 292 pp.

The publishers of this work have been fortunate in issuing it at a time when York is so prominently before the public. Though much has been written about our northern capital, we must say after a careful perusal, that the present volume is as refreshing to read and as well and accurately written as any that have appeared in recent years. The authors have traced the history of the place from pre-historic times; and have taken full advantage of the unrivalled series of episodes that have there occurred. *Inter alia* it is interesting to find how helpful is a local museum in illustrating the history of its district; the specimens now in the York Museum, which are figured, being of great value in this connection. A quite unusual feature in the volume is the way in which the chapters are sub-divided into paragraphs, each averaging half a page in length, the contents being indicated in clarendon type. In this way the interest is kept up, and reference can be made to any particular point at a glance. We don't believe the 'Celt and his Coracle,' or the River Ouse, ever looked like the representation on page 8, not even in the 'Times of Eburach.' Having been printed at the Savile Press, the typography, of course, is all that can be desired.

## FIELD NOTES.

### BIRDS.

**Green Sandpiper and Dunlin at Thirsk.**—Mr. R. Lee informs me that a green Sandpiper was obtained at Thirsk about September 17th. A little girl picked up a Dunlin which was running about the road with a broken wing, evidently damaged by flying against the telegraph wire. It died the following day.—R. FORTUNE.

**Bird Notes from Scarborough.**—A pair of Pied Flycatchers has each summer for the last three years built its nest, and reared its young in the same tree at Langdale End. Dippers have successfully hatched out a brood on the Scalby Beck, within one hundred and fifty yards of the open sea.—STANLEY CROOK, Scarborough.

**Dotterel near Boroughbridge.**—Dr. Steward informs me that when shooting to-day (October 9th) near Boroughbridge, a Dotterel was obtained by one of the party. The plumage was in a transitory condition between summer and winter. The locality and the time of year make the event worth recording.—R. FORTUNE.

**The Crossbill Migration.**—During the month of July, the Crossbill visited the Whitby district in considerable numbers. At Carr Mount Gardens, about three miles from Whitby, about forty were seen on the 10th, and one was picked up dead under some telephone wires, which had probably been the cause of its death. On the 14th, another was found in a dying state, near Whitby, and about the 19th a third was shot out of a flock of a dozen or so, which for a few days frequented a large garden on the outskirts of the town. All three were females or young birds.—THOS. STEPHENSON, Whitby, October 11th, 1909.

**Late Nesting of the Barn Owl.**—At Plumpton, near Harrogate, a pair of Barn Owls had young in the nest on September 17th. They left the nest or were taken between that date and the 19th. The curious fact in connection with these birds is that it is their invariable practice to hatch their young either at the latter end of August or the beginning of September. Dr. Steward and myself have had them under observation for some years. They usually nest in the same tree, but occasionally frequent another one near at hand. No attempt is made at nesting during what may be considered the regular months, so that the brood is not a second one, as anyone finding them

so late might be led to believe. Whatever the cause may be which leads them to defer nesting operations until so late in the season, it certainly cannot be scarcity of food, as the estate upon which they nest certainly furnishes ample, both furred and feathered.—R. FORTUNE.

—: o :—

### LEPIDOPTERA.

**Yorkshire Micro-Lepidoptera.**—Mr. Francis Buckley, of Greenfield, and his brother, who have worked the Micro-lepidoptera of their district assiduously for several seasons, some time ago brought me a number of specimens for examination, and afterwards sent me a full list of their captures. As these include some very interesting species for Yorkshire, it is time they were placed on record.

*Amphysa walkerana*:—Common.

*Peronea comariana*—Only recorded previously from Bramham and Kildale in the county.

*Phlæodes tetraquetrana*—A quite black form of this common species occurs frequently.

*Euchromia mygindana*—‘Quite common.’

*Pamplusia monticolana*—‘Common.’

*Coccyx cosmophorana*—‘Common among small firs at Greenfield.’ Previously only known as a Yorkshire species from two specimens taken on Skipwith Common, by the Rev. C. D. Ash, in 1903.

*Coccyx ustomaculana*—Abundant.

*Pyrodes rhediana*—New to South West Yorkshire.

*Ochsenheimeria bisontella*—Abundant; previously only recorded from Huddersfield.

*Solenobia inconspicuellæ*—Greenfield.

*Lithocolletis vacciniella*.

Mr. Buckley also told me that the black form of *Fidonia atomaria* is of common occurrence on the Greenfield moors.—GEO. T. PORRITT, Huddersfield, October 12th, 1909.

---

In the Scientific Proceedings of the Royal Dublin Society, Mr. M. A. C. Hinton has a valuable paper ‘On the Fossil Hare of the Ossiferous Fissures of Ightham, Kent, and on the recent hares of the *Lepus variabilis* group.’ This is illustrated by views of the skulls, etc., and there are numerous elaborate tables of measurements of bones.

## NEWS FROM THE MAGAZINES.

Mr. R. Standen writes 'Notes on the Cave Spider—*Meta merandi* in *The Lancashire Naturalist* for September.

Mr. A. H. Patterson contributes some fascinating 'Rough Notes on the Fish and Fisheries of East Suffolk' to the October *Zoologist*.

A valuable paper on 'The Insect and Allied Pests of the Hop' appears in *The Journal of the Board of Agricultural* for October.

Mr. J. Wilson has a thoughtful paper on 'The Scandinavian Origin of the Hornless Cattle of the British Isles' in *The Scientific Proceedings of the Royal Dublin Society* (N.S. Vol. XII., No. 15, 1909). It has some notes on old Yorkshire, Durham, etc., breeds.

There is an interesting article on 'The Genus *Chermes* in its relation to Forestry,' by Dr. R. S. MacDougall, in the *Journal of the Board of Agriculture* for September. This principally refers to the disease of the larch tree, which seems to be extending in recent years, and it gives a life history of the aphid.

We learn from *The Quarry* that the steady demand for Whitby jet goods which has taken place recently looks like bringing about a revival of this industry. The stocks of raw material having been almost used up, arrangements have been made for the re-opening of the mines between Staithes and Rosedale.

The *Hull Literary Club Magazine* (Vol. III. part 5), besides containing reports of the various papers read at the club's meetings, contains the President's address on 'The Evolution of an English City' [Hull], and 'Friends from My Bookcase,' by Alderman Brown, in which many local books and MSS. are described in detail.

With the October number of the old-established *Geological Magazine*, the Editor appeals for further support to secure that the journal may be continued. In order that it may be on a business footing in future, it will be necessary to increase the price to 2/- per month, and from fifty to one hundred additional subscribers must be obtained.

We are glad to see that *The Country Home* has been considerably enlarged and improved, without an increase in the price. With the October issue the publishers, The Sphere and Tatler Ltd., have produced a most desirable magazine for all lovers of the country, at the small price of 6d. The articles deal with gardening, nature study, old English homes, china, pets, greenhouses, etc., and the illustrations are as beautiful as they are numerous.

*Christ's College Magazine*, No. 70 (Cambridge University Press), is a 'Darwin Centenary Number,' and contains much interesting matter relating to our greatest naturalist, including some letters hitherto unpublished. Mr. T. E. Pickering writes on 'Darwin's Shrewsbury Days'; Mr. A. E. Shipley, on 'Charles Darwin at the Universities, Edinburgh—Cambridge'; The Master of Christ's College on 'Christ's College in the years preceding the entry of Charles Darwin'; 'Darwin and the Linnean Society,' by Dr. B. Daydon Jackson; 'Letters from Charles Darwin to Alfred Russel Wallace' with notes by Mr. Francis Darwin; 'Present-day Darwinism,' by L. Doncaster; 'Darwin's "Animals and Plants"', by Mr. F. H. A. Marshall; and 'Plants named after Darwin,' by Dr. B. Daydon Jackson. As a frontispiece is an excellent view of the room occupied by Charles Darwin at Christ's College, of which all 'Christians' at Cambridge are justly proud.



# THE NATURALIST.

A MONTHLY ILLUSTRATED JOURNAL OF  
NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY

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THE MUSEUM, HULL;

AND

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WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF

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RILEY FORTUNE, F.Z.S.

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List of East Yorkshire Spiders, Harvestmen and Pseudoscorpions, etc.

T. Stainforth.

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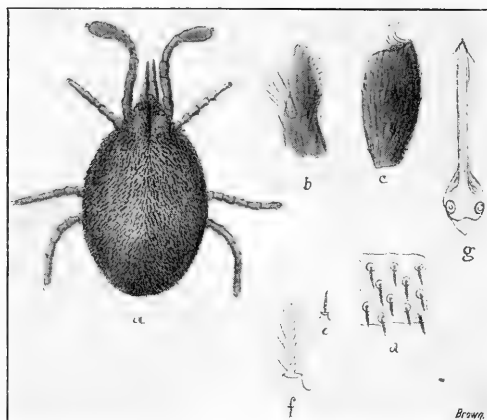
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*a.*—*Ottonia valga*.

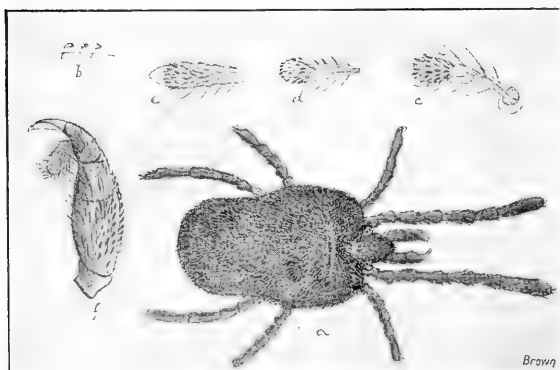
*b.*—End of fourth joint of palpus.

*c.*—End joint of first leg.

*d* and *e.*—Papillæ of body.

*f.*—One of these much enlarged.

*g.*—Crista.



*a.*—*Ottonia clavata*.

*b.*—Papillæ of body.

*c, d* and *e.*—Papilla much enlarged.

*f.*—Palpus.

British Earthmites.

## NOTES AND COMMENTS.

THE LATE DR. W. H. DALLINGER, F.R.S.

We regret to record the death of Dr. Dallinger, which took place at Lee, Kent, on November 8th, at the age of 67. Dr. Dallinger was well-known as a biologist and microscopist; but perhaps appealed to the widest circle as a popular lecturer. He was born at Devonport in 1841, and entered the Wesleyan ministry in 1861. His first scientific researches dealt with the life history of putrefactive organisms. In connection with this work he received a grant of £100 from the Royal Society; and was elected F.R.S. in 1880. Three years later he was elected President of the Royal Microscopical Society, and he also occupied the presidential chair of the Yorkshire Naturalists' Union. His work with the microscope continued to occupy much of his time until his death. In 1891 he brought out a revised edition of Carpenter's Text Book on the Microscope. On the occasion of the British Association meeting at Montreal, he was elected LL.D. of the Victoria University at that place; and the degree of D.Sc. was conferred upon him by Trinity College, Dublin, in 1891.

### A CLIMBING SNAPDRAGON.

In the October number of the 'New Phytologist' (pp. 284-298), an interesting sport of the Common Snapdragon (*Antirrhinum majus*) is described by Dr. T. W. Woodhead and Miss M. M. Brierley. This form appeared in the garden of Mr. H. G. Brierley, at Brimscar, Huddersfield, in the summer of 1908. During this windy season some thirty individuals of the white variety showed a strong tendency to climb; many of their lateral branches were transformed into tendrils, which developed right and left-banded spirals in various positions on the branches, while others twined in a manner similar to that of the *Convolvulus*. A second season's plants grown from cuttings, as well as a second generation grown from seed, showed this tendency to persist, some of this year's specimens having as many as sixty-six branches on one plant, showing the climbing habit. Many of the branches developed coils in such positions as to be quite useless for clinging to a support, but others completely encircled neighbouring branches, and thus possessed all the advantages of a typical climber. The microscopic structure of the climbing branches was examined,

and showed all the histological modifications characteristic of climbing plants in which the habit has long been hereditary. The paper is illustrated by three plates and numerous text figures showing these remarkable modifications.

#### THE BIELSBECK DEPOSIT.

The final report of the Committee for the investigation of the Fossiliferous Drift Deposits at Kirmington, Lincolnshire ; and at various localities in the East Riding of Yorkshire, was presented at the Winnipeg Meeting of the British Association. It dealt with excavations made by the Committee at Bielsbeck, a plan and sections of which are given, together with a list of the bones of *Elephas primigenius* and *Bison priscus* which were secured.

#### MIGRATION OF TERNS, ETC.

During the year large numbers of young birds have been marked by having rings fixed on their legs. The rings supplied by 'Country Life' and 'British Birds' have distinctive numbers, so that wherever or whenever the bird turns up, it will be easy to find out where it was originally hatched. Mr. R. Fortune writes to us, pointing out that many interesting facts relating to the movements of birds are sure to be brought to light, through the endeavours of ornithologists all over the kingdom. In connection with the movement in the North of England, the following facts have come to light. An Arctic Tern, which was ringed by Mr. Fortune on the Farne Islands on July 17th, was obtained at the Barnes Ness Lighthouse, near Dunbar, on August 23rd, and 'British Birds' reports that a Sandwich Tern, ringed at Ravenglass, on June 30th, was recovered at Silloth on August 20th. In both these cases it is interesting to note that the birds were thirty to forty miles *north* of their breeding places, at a time when we should be expecting them more southwards. An interesting record also from 'British Birds' is that of a Black-Headed Gull, which was ringed at Ravenglass, on the West Coast, on June 20th, and was shot at Middlesborough, on the East Coast, on September 18th.

---

*Country Life* for October 16th, contains an interesting article, illustrated by some remarkable photographs, upon the breeding of the Dormouse in the North Riding of Yorkshire, by Mr. Oxley Grabham,

Naturalist,

## THE DISAPPEARANCE OF THE PLAICE.

PROF. W. GARSTANG, M.A., D.Sc.

IN 1875 the plaice caught in the North Sea was 549 cwts., and in 1892 it was 168 cwts.; in the same period haddock dropped from 837 cwts. to 436 cwts., prime fish from 63 cwts. to 29 cwts., and rough fish increased from 30 to 49 cwts., and the total was 1565 cwts. in 1875 as against 638 cwts. in 1892. In 1867 the total was 2012 cwts. Official statistics since 1892 told very much the same tale.

One of the methods of tracing the migration of the fish in the North Sea is by means of labels or tallies, and inducing to the fishermen to return them, and then mapping them out. Plaice marked and put into the sea between the Thames and Belgium, that is in the southern part of the North Sea, in the Spring, migrate northward, travelling great distances. Fish marked and placed in the sea off the Danish coast make out towards the open as the summer advances, and partly return in the following winter. The summary of these and other experiments shows that the fish tend seawards and northwards in the summer time. Fish marked and placed in the water in the north of the North Sea, are practically caught in the south in the winter months, but found to be returning northwards in the summer. These fish are apparently coming to spawn, and it was a curious fact that in the first year of these experiments all the fish caught coming south were males. Later, when the females were found coming south, the females were of a larger size. As a matter of fact, the fish put in in the first year had been rather a small lot, and the male plaice spawned when smaller than the female. All the fish migrating to the south in the winter time were mature fish, and the reason we had no females in the first year of the experiment was that the females caught and marked had not reached maturity. Plaice spawned from January to March, but chiefly in February, and to prove whether the southern part of the North Sea really was the spawning ground of the plaice, a special net was made for dredging up the minute eggs of the plaice, and dredgings made all over the North Sea proved the truth of the theory; the eggs were in far greater numbers in the southern part of the sea than in the northern part.

If one looks at the section of the backbone of any fish, he

will find a number of rings or marks. The age of the fish can be determined by counting these rings. But inside the heads of many fish is a little bone of a flattened or oval shape, called the ear bone or the otolith. It is not strictly the ear bone, but a little nodule inside the hearing organ, helping in some mysterious way to enable the fish to appreciate vibrations in the surrounding waters. These bones have first an inner white disc, then a dark ring, and next a light ring, and so on white and dark rings alternately. A large number of 6-inch fish was caught, and in the otolith of nearly all of these there were two light and two dark rings. The light rings correspond to the summer growth, and the dark rings to the winter growth. Plaice grew about two inches each year, and one 17 inches long, proved to be seven years and seven months old. The females grow faster than the males. At eight years the female is over eighteen inches, whilst the male is less than fifteen inches. This is probably due to the fact that the males spawn a year earlier than the female, and so stunt their growth. The ordinary sizes of plaice are at three years, eight inches, and at five years, twelve inches.

In the southern waters the percentage of males which are mature are: at three years, 20 per cent. ; at four years, 60 per cent. ; five years, 90 per cent. ; six and seven years, 100 per cent. There are scarcely any females in the southern grounds mature at four years, and not more than half until they are six years. In the northern seas there is a year's difference in the time of spawning. Here the majority of the males are not mature until they are five or six years old, as against four years in the southern waters. In the females there is no majority of maturity until they are six years old, and then the large majority of them are mature.

A line drawn off the Continental coast encloses no fish but what are mostly less than eight inches in length. The next zone further out they are generally from eight inches to ten inches ; in the next zone, ten inches to twelve inches ; and in the next, including a part of the Dogger Bank, twelve to fourteen inches. Towards the north the plaice become larger and larger, on the west portion of the Fisherbank and in the Gut and northern part of the Dogger they are sixteen inches to eighteen inches, and still further north eighteen inches in length. As to age, inside the first zone—(*i.e.*, along the Danish and Dutch coast)—they are less than three years old ; in the next zone



they are two and three years, still further seaward, including the Lower Scruff and the Lowestoft Deep Water, they are three to four years, on the south part of the Dogger three to five years, further seaward on the north part of the Dogger, on the west of the great Fisherbank, four to five years, and then above the Gut four to six years old. The fish are in large numbers in the first zone, but as they move seawards and increase in size they also decrease in numbers. Experiments show that whereas 1000 fish twelve inches in length are secured in an hour's fishing on the east side of the North Sea, only 50 per hour are caught further out to sea. This was in the Spring of the year. From July to December the mass of fish had moved a little further from the coast into the sea.

Below eight inches the males exceed in number, above that size the males lose their preponderance, at fourteen inches they rapidly fall off, and over eighteen inches there are practically no males at all to be found.

The mass of White Sea plaice is found to be mature; the number of mature plaice there enormously exceeding the number of immature plaice, and they extend over a very great range of size. The average size at which the females become mature there is sixteen inches, so that the females begin to spawn at exactly the same size as in the North Sea. But on examining the otoliths of these sixteen-inch fish in the White Sea they are found to be very much older than the sixteen-inch North Sea fish, so that they grow very much more slowly. A White Sea female plaice begins to breed at the age of eleven or twelve years, whereas in the North Sea they begin at six years. The males begin to breed in the White Sea at eight or nine years of age. The plaice there are very considerable in number until they are twenty-two inches in length, and they are then not less than twenty years old. From these and similar facts, it might safely be inferred that on a virgin fishing ground, like the White Sea, the males continue to spawn in practically undiminished numbers for at least five years, and the females for at least eight years. In the North Sea there are practically no males over eight years, whereas the females occasionally grow to be twenty years old, but such are extremely scarce; they are twenty-four inches in length at least. The bulk of the fish found on the central grounds of the North Sea are immature.

Of 6147 fish caught and marked, and then liberated in the

North Sea, 1409 have been caught and returned within twelve months. In the years from 1903 to 1906 the recapture of the marked fish was, of the very small, 11 per cent. per annum; from eight to nine inches, 21 per cent.; ten to eleven inches, 33 per cent.; twelve inches, 35 per cent.; fourteen inches, 40 per cent.; larger fish, 24 per cent, or a percentage of 23 of all sizes. Now if the fishermen caught 40 per cent. of the fourteen-inch marked plaice within a year, it may be fairly estimated that they caught 40 per cent. of the unmarked fourteen-inch plaice. The trawling is evidently so intense that amongst the fish of a marketable size the fishermen are catching from 33 to 40 per cent. in one year. If 1000 female plaice were placed in the sea, say of eight or nine inches, and three years old, 20 per cent. would be caught in the first year, leaving 800 four year olds. The fishermen would catch 30 per cent of these in the following year, leaving 560 five year olds. At that age the female plaice begin to breed, but only in a very small proportion. One tenth (56) of these might be estimated as breeders. The fishermen caught 40 per cent., leaving 336, of which two-thirds (224) were breeders, and, after that time all would be mature. The result is that from the 1000 fish there would be only 728 breeding operations during the eight years following the onset of maturity, which means that only about three-quarters of the three year old stock would ever breed once at all. In the unfished sea out of a thousand plaice the total breeders, after allowing for depletion by natural enemies such as sharks, would be 484 in the same number of years by the same table. The net result is more than interesting, and is of vital importance. The fishing in the North Sea under the present conditions gives only one breeder for every six or seven that would have been secured in the unfished primitive times. As a result of the intense fishing, the age of the spawners or the age of breeding is reduced. In the unfished area the average age that most fish start spawning is about eight years; in the North Sea now it is six years. This means that we are putting a premium upon early breeding, and again this is a matter for consideration whether we are not thereby lowering the stamina of plaice, and encouraging a race of small plaice. In the English Channel, where trawling is an old occupation, they begin to breed at a very early age; in the south of the North Sea they begin breeding a year later, and in the north of the North Sea a year later still, whilst in the White Sea

which is virgin ground to the trawler, the plaice do not spawn until two years after the North Sea plaice. If fishermen only caught the twelve-inch and larger plaice, and left the small alone, they would still depend on one-sixth of the original stock.

The impoverishment of these fish should be stopped by Act of Parliament, but there are difficulties. If a size limit were enforced the trawlers would go elsewhere, the intensity of fishing would become even greater among the larger or breeding stock, and therefore whilst on one hand we saved the immature fish, with the other hand they destroyed the eggs from which these small fish were produced, by the catch of the spawn fish. In my opinion it is safer to destroy 20 per cent. of the smaller plaice than add to any extent to the destruction of the fish on which the production depends.

It has been found that if we transplant the small plaice from the inshore grounds to the Dogger Bank, they grow enormously quicker than those left on the eastern banks. On the Horn Reef an eight inch plaice grew one and a half inches in one summer; transplanted in the Dogger Bank it grew five inches in the same time. If we look at that from the point of view of weight, it will be seen that whilst the Horn Reef plaice had grown to six ounces, the transplanted one had grown to one pound. Some use might be made of this wonderful growing power of the fish on the Dogger Bank. An expenditure of £1000 would ultimately yield from £4000 to £5000, if spent on transplantation.

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**The Earth : in relation to the Universe, seen and unseen,** by **Polaris.** Part I., Book 2. Registered. Darlington: Bailey & Co, 1909. 86 pp. In this extraordinary book, the writer deals with an immense variety of subjects, freely quoting from all manner of publications usually to the extent of about half of each page. Amongst the references to quotations we find, quite close together, G. K. Chesterton, 'British Weekly,' 'The Naturalist,' Proverbs of Solomon, Romans, R. L. Stevenson, Psalms, Carlyle, etc., etc. The chapters are headed 'The Test of Truth'; 'Concentrations'; 'Of Water and of the Spirit'; 'The Golden Mean'; 'Individuality'; 'The Golden Rule'; 'Bdellium and the Onyx Stone'; 'The Powers that be'; 'The Real and Unreal'; and 'Havilah.' We have had this pamphlet on our desk some time, but regret we have not had opportunity to read it. Having noted its contents, we leave such of our readers as are interested to procure it themselves.

We have received the admirably illustrated **Report of the National Trust** for places of historic interest or natural beauty, which contains an account of an excellent year's work. Those who take an interest in the preservation of England's beauty spots, should get a copy of this publication. One will be gladly sent on application to the Secretary, at 25 Victoria Street, Westminster.

## THE STUDY OF A FIR CONE.

MRS. E. HUGHES GIBB.

(Continued from page 388).

The next thing to notice is the perfect orderliness with which the numbers arrange themselves ; thus if we ascend one of the spirals going to the right, we shall find that the number of every scale is eight more than that of the preceding one ; 1, 9, 17, etc. ; 6, 14, 22, 30, and so on. Following a left-hand spiral (these are less obvious in the drawing than they are in the real cone) each scale is in its number, five beyond that of the preceding one ; 1, 6, 11 ; 4, 9, 14, 19, and so on. Or if we choose to follow the steeper apparent spirals to the left which present themselves to us in this sketch, we shall still find a perfect sequence of numbers, with 13 between each : 9, 22, 35, 48, 61, etc. In fact, whichever way we travel, there is no haphazard along the road, but a bewildering orderliness which gives the impression that every pathway of figures has been prepared with superhuman ingenuity.

To discover the origin of this perfect numerical arrangement we must study the base of a straight, well-grown fir cone (one from a spruce fir is much the best for the purpose). Holding it with the bottom towards us, it will be seen that a certain number of spirals start from the base and ascend to the right, whilst another set go to the left. Let us count each set.

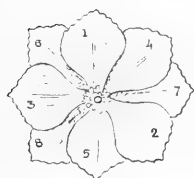


FIG. 4.

Showing the placing of the first 8 scales at the base of a fir cone.

In the fir cone sketched, eight spirals ascend to the right and five to the left, and this is the most usual arrangement, but it is reversed in some spruce and Scotch fir cones, and in larch cones there are three spirals going one way, and five the other.

Now if the lower scales are broken off for some little distance up the cone, it will be seen that no matter how thick or how thin the portion being stripped, there are always five scales in each whorl or round of the cone (see figure 4).

Three of these stand quite clear and free, and two are overlapped on one edge. Let us number the free ones 1, 2, and 3, and the overlapped ones 4 and 5. Three more scales, 6, 7 and 8, overlapped on both edges by members of the first five, peer out between 1 and 3, 4, and 2, and 5 and 3 res-

pectively, and manage to shew a little strip of their base running to the centre of the cone. If we strip off 1, 2 and 3, the result will be that 4, 5 and 6 will be left clear, 7 and 8 will be overlapped on one edge only, and three new scales will peer between as did 6, 7 and 8. In short, the old order will instantly be restored with a general shift round; and we may continue to strip the cone with the same result (like turning a wheel) to the end.

Here again the phyllotaxian numbers are met in a new way. The *three* free scales, the *five* which form the whorl, the *eight* which complete the series of the secondary spirals—these are our old friends shewing themselves in the very heart of the cone. The ring of five scales which encircles the bottom of the cone is the starting point of the five secondary spirals running to the right or left, as the case may be. Each one of these five scales is the origin of a spiral, and it will now be easy to see how these coils are formed, and how we may correctly number each scale upon the cone. It is necessary here to make the preliminary remark that the object of the spiral arrangement of leaves being to secure as much light and air as possible for each, a corkscrew-like progression is not the plan adopted, and 2 will not be found next to 1 (as may easily be seen upon consulting the diagrams), the coil making a sweep of one-third around the stem before the second scale finds its place, a similar one before the third is placed, and then with two more sweeps dropping 4 between 1 and 2, and 5 between 2 and 3. When this first circle is finally disposed, the sixth scale is invariably placed next to 1, either on its right or left, according to which way the five secondary spirals are to proceed; 7 will be in the same position with regard to 2, and so on; and the five secondary spirals are started. Having marked one of the three free scales at the bottom as No. 1, we could now correctly number the whole cone without difficulty, so as to shew the course of the invisible central spiral. If the one chosen has eight spirals to the right and five to the left, the numbers of the first five scales *from left to right* will run 1, 4, 2, 5, 3; and following the spirals to the left which are started respectively by each of these, every scale must be marked with a number five in advance of the preceding one; 1, 6, 11, 16 and so on. If the cone has five spirals to the right and eight to the left, the numbers of the first five scales will be the same, only running *from right to left*, and the resulting spirals to the right will be numbered in the same way.

The eight secondary spirals running in the opposite direction have still to be accounted for, and if the diagrams shewing the manner of their origin are carefully studied, very little explanation will be necessary. In fig. 5 the double spokes represent the first five scales; the single ones mark the position of the next three, making the series of eight which starts the eight spirals running to the right, each of these eight scales, as will be seen, originating a spiral of its own in which every progressive member numbers eight more than its antecedent. The dotted spokes are to shew how every point of space around the stem is gradually filled as the general spiral proceeds, not

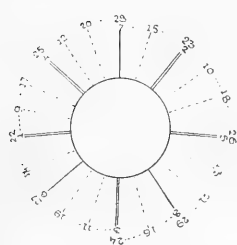


FIG. 5.

Showing the manner of formation of secondary spirals on a spruce fircone having 8 spirals going to the right and 5 to the left.



FIG. 6.

Showing the manner of formation of secondary spirals on a cone having 5 spirals to the right and 8 to the left.

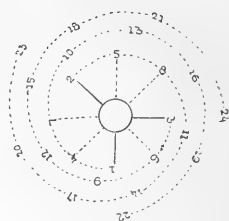


FIG. 7.

Shewing the manner of formation of secondary spirals in a larch cone having 3 spirals to the right and 5 to the left.

one single scale being placed exactly over another till 21 have been arranged. The beautiful method displayed in the irregular placing of the first eight scales is clearly seen if diagrams Nos. 3 and 4 are compared. No. 3 shews how the first and fourth scale and the second and fifth cling together, leaving wider spaces between; No. 4 illustrates how cunningly these wider and narrower spaces have been calculated to accommodate the occupants designed to fill them, and how marvellously the whole plan works in a perfect order. Figs. 6 and 7 tell their own story, and hardly need comment or explanation.

Anyone who has taken the trouble to follow carefully the details given in order to lay bare the hidden story of the fircone,

must be impressed with the extraordinary amount of thought, ingenuity, accuracy and variety in unity which is compressed within this small space. The fircone, of all natural objects, appears to be the fittest symbol of Nature in her widest sense. It is the spiral and not the circle which is written upon the face of the Universe, and upon every particle therein. We ourselves in our ceaseless journey around the sun, are describing a spiral course, for the sun himself moves on—perhaps in some greater unknown spiral of his own.

The great central spiral upon which all things are strung is ever being sought but never to be found by mortal man. Darwin in his wonderful discovery of that great secondary spiral, Evolution, was ready to believe that he had come upon it, yet he came to recognise in the end that, great and almost inspired as his vision into origins was, it could not gather all into its mighty coil. That which can do so must of necessity extend so far above and beyond our little earth that it is futile for man to expect to read and decipher it in his present state of existence. The secondary spirals indeed often lie within our mental reach, and in the study of their origin we may perhaps learn to infer something of that wonderful rhythm which sings deep down in the heart of things, the rhythm of the coil and the leaf, of the upward movement and of life, the rhythm which, if we knew it, would make all things plain for us, and all things in harmony. This, at least, is the philosophy of the fircone.

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**Palæontology. Invertebrate**, by **Henry Woods, M.A.** Fourth Edition. Cambridge: the University Press. 1909, 388 pp.

The excellence and usefulness of this well-known handbook is proved by the fact that a fourth edition has been called for in a comparatively short time. Of its kind the book is the best. The numerous illustrations are largely drawn in order to give the student an idea of the principal features which require attention. A very helpful feature is the list of monographs dealing with the various sections dealt with.

**History of the Geological Society of Glasgow, 1858-1908.** Edited by **P. Macnair** and **F. Mort**, Glasgow, 303 pp.

This work has obviously been a labour of love on the part of the Editors, who are secretaries of the Society. Few provincial Societies can claim as many prominent scientific men as members as can the Glasgow Society, and its history is refreshing to read. A valuable feature is the biographical portion, in which notices of many well-known hammer-men, past and present, are given. The volume was issued to commemorate the Jubilee of the Society, and contains chapters on the fifty years' work under the heads of Physical and Dynamical Geology, Mineralogy and Petrology, Stratigraphical Geology, Palæontology, and Glacial Geology. There are many portraits, including those of Kelvin, John Young, H. W. Crossley, Dugald Bell, Sir Archibald Geikie, Prof. Lapworth, Dr. B. N. Peach and Dr. R. H. Traquair. We are sorry there is not one of Croll.

# GENERA AND SPECIES IN FUNGI.

M. C. COOKE, LL.D., M.A., A.L.S., V.M.H. etc.

(Continued from page 392).

Not only does *Polystictus abietinus* and also *Poria vaporaria* sometimes assume the distinguishing features of *Irpex*, but also other species of the *Polyporei* normally pass into *Irpex*, and thus unite the *Polyporaceæ* with the *Hydnaceæ*. But if we quit genera and the larger groups, and direct attention to species themselves, the most indefatigable field hunters will be able to furnish many instances which have come under their own observation, in which allied species have exhibited so close an affinity that it has been difficult to decide to which species the abnormal forms actually belong.

Let any one examine at a foray a hundred specimens of *Amanita phalloides* and *Amanita mappa*, and I venture to predict that they will be able to show a complete series of gradations in which it would be impossible to determine where the one species ends and the other begins.

The larger the experience of the mycologist in field work the more ready will he be to acknowledge the many instances, which have presented themselves in which abnormal forms or 'missing links' have presented themselves, in which it seemed impossible to determine, with any certainty, to which of the two species the delinquent actually belonged. And it is these 'missing links' which constitute the gradation of species into species, and genus into genus, so as to combine and form a graduated series, sliding and melting the one into the other, and forming one continuous and harmonious whole.

It would be absurd to suppose that any one who is acquainted solely with a local flora could realize this transition, or recognise more than a very few of the 'missing links,' but the more his experience is expanded, the larger the number of these 'abnormal' species (as they have been called) will have come under his notice.

In the present notes I have confined myself almost entirely to British examples, whilst a large number of exotic examples have constantly floated through my memory to strengthen me in my hypothesis.

I find myself strengthened in this belief collaterally by remembering that Worthington G. Smith, some quarter of a century ago, advocated a view which would be practically

Naturalist,



identical, although in different terms, and applied chiefly to species.

This theory was, that having regard to varieties and 'abnormal' species, their origin must be traced to hybridization, and that most varieties, and many 'intermediary' species were hybrids. Of course the objection to this hypothesis was then as it is now, that sexual characters have not been discovered and defined in Hymenomycetal Fungi, and consequently, as hybrids are the result of sexual association, there could be no hybrids.

Still the ultimate conclusion was the same, that one species was linked to another naturally, and that the whole scheme of existence in the Agaricinæ was unity, and a graduated sliding scale in which one species glided imperceptibly into another through the intervention of varieties or abnormal species.

What also is the meaning of George Massee's application of the theory of evolution in 'The Evolution of Plant Life' and 'Phycomycetes and Ustilagineæ,' except that during past ages, as well as the present, one form has been developed from another, and that in plant life the parts glide imperceptibly the one into the other, and constitute an unbroken chain of organisms which we recognise as the 'vegetable world.'

Thus, then, we observe that it is no new theory that one form, or so-called species, merges into another by links, which are now sometimes obscure or missing, but which unite, not only all the members of one natural order with another, but also the larger groups such as the Fungi with the Algæ, and other of the Cryptogamia, although we may have to travel back thousands of years to realize their association.

This, then, is a slight and imperfect sketch of what we mean when we say that there are, in nature, no such hard and fast lines of demarcation as those artificial groups which we call orders, genera and species.

It may be hard to believe this all at once, but it is a hypothesis which age and experience will strengthen, and should not be discarded, because so many of the links have died out, or are otherwise missing.

Finally, we are reminded how many species (so called) have been figured, or described, by old authors, of which no representatives have been seen in these latter days, and which were probably good and genuine figures and descriptions, but are

now treated with undue suspicion, such as perhaps also adheres to the more recent announcements of forms which have been met with but once or twice in a generation, and then all, except perhaps the names, have passed into oblivion.

Surely there is some interest in these 'missing links' when regarded in connection with the hypothesis which I have attempted, imperfectly, to illustrate; and one of the most useful occupations for the field hunter of the present day would be, not so much to hunt for new species, as to recognise the manifold links which unite the old ones.

The latest confirmation of these views will be found in W. G. Smith's 'Synopsis of the Basidiomycetes' (page 2)—'The Basidiomycetes are highly plastic and variable. No one species is constant in all its characters, and a single example seldom wholly agrees with any other single example of the same species. Examples which appear to be intermediate between allied and sometimes between not allied species, are frequently met with. About one species in ten is perhaps fairly well and distinctly marked, but all species will at times present aberrant characters. Any one character is liable to fail in the determination of species, therefore all the characters must be studied together.'

And in a letter from the same authority, he states:—'There is a striking instance in *Paxillus porosus* (Berk.). I had a drawing of this species unnamed for years! I kept it with *Boletus*. It has as much claim to a place in the latter genus as in the former. The hymenium is wholly porous.'

In this connection I cannot forget the constant warning of the late Rev. M. J. Berkeley against *long* descriptions of species to which many modern authors were addicted. 'Any good description,' he said, 'can be contained in three lines, and exceeding that it is but the picture of an individual.' And he was accustomed to quote the custom of old authors, and especially of Linnæus. Because, as he observed, the description of a species should contain the features which distinguish it from allied species, and *no more*, all other features are merely the variations of individuals, just as a sandy-haired man with blue eyes differs from a black-haired man with brown eyes, or a black pig from a white one. He justly observed, that a competent mycologist would distinguish at once the salient features which characterized one species from another, and did not require many words to write it down. Nor need he ever hesitate for a specific name whilst he kept this feature in view. Fancy and complimentary specific names he regarded as simply evidence of incompetence, or idleness in the person using them.

## FUNGUS FORAY AT CASTLE HOWARD.

C. CROSSLAND, F.L.S.

THE twenty-second Yorkshire Fungus Foray (the nineteenth annual) organised by the Union, was held at Castle Howard, September 18th to 23rd. Castle Howard was a wise selection on account of the great wealth of old woodland in the neighbourhood. Permission to the Union to investigate the mycological flora of this magnificent and extensive estate was kindly and readily granted by the Earl of Carlisle.

The district is classic ground from a botanical standpoint. Dr. Spruce, the eminent botanist, (who investigated the moss flora of the Pyrenees, and then for fifteen years braved the hardships attending the exploration of the flora of the Amazon and the Andes, so vividly portrayed in 'Notes of a Botanist on the Amazon and Andes,' edited by his friend, Dr. Alfred Russel Wallace), was a native of Ganthorpe, a little village near Castle Howard. Here, and later at Welburn, his father kept a boarding-school. As a youth, Spruce diligently studied the plant life of this and the Malton District. By the way, Spruce derived his first knowledge of, and love for mosses, from Samuel Gibson, a well-known artizan-naturalist of Hebden Bridge.

Our old and valued member, Mr. M. B. Slater, J.P., who attended the foray on the Monday, has been a keen and constant student of the mosses and hepatics of this locality, in company at one time with Dr. Spruce, whom he often visited during the doctor's sojourn at Welburn, and afterwards at Coneysthorpe.

This also is the district where Mr. Massee first took up the study of fungi, during his residence at Bulmer. To him the ground was familiar, and his visit pleasantly renewed his former acquaintance with his old gathering grounds, where several species new to the British flora were found by him, years ago.

The general meeting-room was the Guest House near the Castle, and most suitable for our purpose; but, unfortunately, we had to billet at the village of Welburn, about a mile and a half away. This reduced the time generally given to the work-room, as we were unable to put in the usual hour before breakfast. Dinner only was served at headquarters.

A beginning was made on Saturday in the woods in the

immediate vicinity of the station (Ox Carr Wood and Ben Wood), prior to going up to the work-room. It was near an old stump in a field corner at the end of Ben Wood that *Pluteus cervinus* var. *rigens*, a new British record, was found.

It is our usual custom, as soon as we get settled at headquarters, to look through the garden, if there is one. Here was one which appeared to have been neglected very much by previous tenants. The present holder is a new-comer, and seems anxious, if possible, to straighten things up a little. Several parasitic fungi were at work. *Uromyces fabæ* was on most of the bean leaves ; *Peronospora parasitica* on shepherd's purse ; *Phytophthora infestans* on the potato plants and in the tubers ; *Fusicladium dendriticum*, the cause of the 'apple scab,' was abundant on the apples ; this is one of the most injurious of fungus parasites which attack the apple. It is dealt with in No. 131 of the valuable 'Leaflets' issued by the Board of Agriculture and Fisheries, which may be had for the asking, and in Massee's book on 'Plant Diseases.' *Monilia fructigena*, another parasitic fungus pest, was not seen on the apples, but it was picked up on a half-mummified fallen plum. Of course, these and other fungus pests find their way to the best regulated gardens and orchards, but if they are attended to in time, their spreading propensity is curtailed.

Guides to the woods were kindly provided by the agent on Monday and Tuesday. Day after day interesting species were brought in ; one especially so to the writer. This was *Mycena pelianthina* Fr.=*Agaricus denticulatus* Bolton, a remarkably fine species for this genus. It belongs to the *Calodontes* section, which have dark-edged denticulate gills. The denticulations in *pelianthina* consist of bunches of purple cystidia, while similar structures spring singly, but plentifully, from among the basidia on the gill sides, imparting a rather remarkable appearance to these organs. This beautiful agaric was first found at Halifax, in 1787, by J. Bolton, who described and most appropriately named it *A. denticulatus*. Fries, later, named the same thing *A. pelianthinus*. It has rarely been found, but was met with at Castle Howard during the 1892 foray.

The estate is heavily timbered, and portions of the woods are said to be continuations of original forest ; there are many fine old oaks, a few of which the suns of five hundred summers at least, have shone upon. Other parts have been plentifully

planted, thanks to the forethought of the third Earl of Carlisle. The fine avenue, stated to be the longest in England, is formed of clusters of twelve to eighteen grand old beeches, the effect being magnificent. Plantations abound on other parts of the estate. An obelisk in the park, erected by the third Earl in 1731, records, in the following words, the laying out of the plantations, etc., a task commenced in 1702 :—

‘ If to perfection these plantations rise,  
If they agreeably my heirs surprise,  
This faithful pillar will their age declare  
As long as time these characters shall spare ;  
Here then with kind remembrance read his name  
Who for posterity performed the same.’

We thank him heartily, and remember him most kindly. The approximate age of most of the trees is here indicated. Signs of rapid decay are evident among them, and now and again one of the monarchs, of the avenue is blown down. In their old age the beeches are rapidly becoming subject to the attacks of *Armillaria mucida*, a beautiful, white, but slimy parasitic agaric. This appears to be spreading among the aged beeches. It is a fungus which, so far as observations in this country have gone, confines its attentions to this tree, and here it has plenty of scope. It is a wound parasite, reaching its prey, by aid of its spores, through wounds in the bark, caused generally by the breaking away of branches. It has been proved possible to artificially inoculate healthy trees in this way. Its brother parasite, *Armillaria mellea*, is much more destructive, as it attacks various species of orchard and forest trees. There was very little of it to be seen at the time of our visit, however ; but it was there. *Polyporus squamosus*, a parasitic polypore, was also at work on the beeches. A fine specimen growing out of the stump of a broken branch was carefully cut off, along with the stump, and taken to Kew Museum, as a specimen of a timber tree parasite.

*Ustulina vulgaris* and a few other saprophytic fungi were found on decaying parts of the beech trunks.

Respecting the general run of ground fungi, the season is about three weeks later than usual, and the crop much lighter. Cold summers like the last, if we can call it a summer, retards the mycelial development of saprophytic fungi in the ground, in decaying timber, and among rotting leaves. There has been plenty of moisture, but even this very necessary element, unaccompanied by heat, has not the desired effect. The

growth of the ordinary mushroom has suffered from the same cause.

Weather influences notwithstanding, it is almost certain that some uncommon species or another will turn up at each foray. The noble *Agaricus augustus*=*Psaliota augusta* was met with ; while not found plentifully in Britain, it constantly is here. It has several Yorkshire records. In Sweden it is common on old, deserted ant-hills. *Query*—Can it be cultivated in a conidial condition by the ants, and when these intelligent and diligent insects desert old nests, the fungus is left to its own resources, complete its life cycle ?

There was variety if not quantity. Rarely are eleven species of *Pholiota* found at one foray, or eight species of *Amanita*, or sixteen of *Hygrophorus* ; of the latter, *pratensis* and *conicus* were very abundant. *Collybia radicata* was extremely common, and in great variety in size and appearance. So with *Lepiota procera*, at least half-a-dozen forms could have been selected from the tables which inexperienced students might easily have taken for distinct species ; the principal difference being in the markings on the stems, and the manner in which the outer envelope of the sporophore in its infant stage had been broken up during subsequent development.

*A. phalloides* was one of the eight species of *Amanita*, the most poisonous agaric likely to be gathered by inexperienced fungus hunters.

Two or three specimens of a whitish, branched, white-spored *Clavaria*, which does not fit any published description, were brought in. It has been thought best to hold this over awhile to see if further specimens are discovered before publishing a diagnosis, should it prove to be new. It is allied to *C. umbrinella*. The specimens are in the care of Mr. A. D. Cotton at the Kew Herbarium.

Space cannot be afforded for a tithe of the numerous interesting notes which might have been written concerning many of the fungi collected.

Twenty-two myxomycetes were noted, some being in great profusion in both plasmodia and mature conditions ; probably the well-wooded district and quantity of decaying wood accounts for their prevalence. A mass of *Fuligo varians* left the rotting wood on which it was brought in, and found its way during the night on to a plate, where it ripened out.

All the necessary apparatus in the shape of books, micros-

copes, etc., were provided by the committee, and were at the service of anyone present.

Mr. Massee brought beautifully-mounted slides, showing the grass disease *Cladochytrium gramineum* Busgen. This disease produces scorched, sickly-looking patches in the grass.

A dark-coloured mould, *Hormodendron hordeii* Zopf. was found on *Circæa lutetiana*, which may be considered the first formal British record.

The total number of species determined, including a few taken home for further study by several members, is four hundred and ninety, and eight varieties. Of these, two hundred and forty-four are previously recorded for Castle Howard and Bulmer. Of the remainder, one is a new species to be called *Flammula carnosa* Massee, and to be fully described in a future issue. *Cercospora calendula* Sacc., on cultivated marigold in the Inn garden, Welburn; *Acremoniella atra* Sacc., on moss and dead leaves; *Hormodendron hordeii* Zoph., and var. *rigens* of *Pluteus cervinus* are new to Britain.

The following are new discoveries for the county:—

<i>Scleroderma vulgare</i> var. <i>lævigatum</i> .	<i>Polyporus cerebrinus</i> .
<i>Amanita strobiliformis</i> Vitt.	<i>Helvella atra</i> Konig. On the ground
<i>Tricholoma argyraceum</i> (Bull).	in Ray Wood.
<i>Clitocybe rivulosa</i> (Pers.) Fr.	<i>Sphærospora confusa</i> (C. K.) Sacc.
Among grass near Carrmire Gate.	On the ground in Ray Wood.
<i>Collybia tylicolor</i> Fr.	<i>Helotium phyllogenon</i> Rehm.
<i>Agaricus xanthodermus</i> Gen.	On the nerves of decaying poplar
<i>Psilocybe catervata</i> Mass.	leaves.
<i>Coprinus macrocephalus</i> Berk.	<i>Molisia mutabilis</i> .
<i>Hygrophorus leporinus</i> Fr.	<i>Septoria ulmi</i> Kye. On elm leaves.
Brought from Scarborough by	<i>Septoria heracli</i> Fekl. On cow pars-
Mr. Peck.	nip leaves.
<i>Marasmius impudicus</i> Fr.	<i>Chalara longipes</i> Cke. On decaying
<i>Marasmius cohærens</i> (A. & S.) Fr.	bark.
(= <i>Mycena cohærens</i> Fr.)	

All were gathered in the neighbourhood of Castle Howard, excepting *Hyg. leporinus*.

It was considered by all present that the foray had been one of the most successful and enjoyable, with one exception, hitherto held by this section. There was a good attendance, and each one put a bit of zest into the work, either in collecting or determining, or both.

In addition to Yorkshire members, there were members and friends from Kew, Boston, Derby, Alderley Edge, and Liverpool.

A box of specimens was sent from Scarthingwell Park by the Leeds Naturalists, per Mr. W. D. Roebuck.

The weather was all that could be desired for collecting

purposes. On the Monday there were several friends from the Malton Society, including Mr. M. B. Slater.

In the evening Mr. Massee gave a most interesting and instructive address on 'The Origin and Tendencies of Parasitism in Fungi.' Mr. Clarke occupied the chair. Mr. Massee was heartily thanked for his lucid, well-arranged address. We hope to print a pretty full account in a later issue.

On the Tuesday, Mr. Massee presiding, Mr. Clarke read an interesting paper on 'The Common Mushroom: its Varieties and Allies.' The paper practically dealt with the whole British portion of the genus *Psaliota*, of which our common mushroom is the best known, and most useful member. All the information that has hitherto become known regarding the toothsome mushroom, including some of Mr. Clarke's own observations, were included in the paper, which was illustrated by a large series of coloured drawings, life-size, hung round the room. The thanks of the committee and friends were warmly accorded to Mr. Clarke for the paper.

A vote of thanks was unanimously passed to the Earl of Carlisle, for so kindly allowing us to have the run of the estate. The agent was also thanked for providing guides.

The annual business meeting of the section was then held. Mr. Massee was re-elected Chairman; Mr. C. Crossland, Convener and Representative on Executive; Committee as last year, with the addition of Mr. James Needham, all subject to approval at the next Annual Meeting of the Union.

After discussing the place for next year's foray, it was eventually decided to recommend Arncliffe and Mulgrave. It was thought well worth while to pay yet one more visit to Mulgrave to see what can be added to its already very extensive mycological flora.

The following are the additions to the Castle Howard and Bulmer district. Those marked † are additions to Vice-County N.E.:—

*Lycoperdon cælatum.*  
*Amanita phalloides.*  
*A. mappa.*  
*A. excelsa.*  
*A. spissa.*  
*Amanitopsis fulva.*  
*Lepiota excoriata.*  
*L. gracilentia.*  
*L. granulosa.*  
 † Var. *rufescens.*

† *L. amianthina.*  
*Armillaria mucida.*  
*Tricholoma equestre.*  
*T. grammopodium.*  
 † *Clitocybe tumulosa.*  
*C. geotropa.*  
*C. tuba.*  
*C. metachroa.*  
*C. ditopoda.*  
*Collybia butyracea.*



*Collybia ingrata.*  
*C. conigena.*  
*C. acervata.*  
*C. atrata.*  
† *Mycena olivaceo-marginata.*  
*M. pura.*  
*M. lactea.*  
*M. polygramma.*  
*M. leptcephala.*  
*M. filipes.*  
† *M. amicta.*  
*M. acicula.*  
† *M. juncicola.*  
† *Omphalia philonotis.*  
*O. campanella.*  
† *O. camptophylla.*  
*O. bullula.*  
*O. integrella.*  
*Pleurotus ulmarius.*  
*Pluteus phlebophorus.*  
† *Entoloma porphyrophæum.*  
*E. jubatum.*  
*E. speculum.*  
*Leptonia solstitialis.*  
*L. asprella.*  
*Nolanea nigripes.*  
*Pholiota togularis.*  
*P. radicata.*  
† *P. aurivella.*  
*P. spectabilis.*  
*P. adiposa.*  
*Inocybe incarnata.*  
*I. echinata.*  
*I. hiulca.*  
*I. eutheles.*  
*I. destrecta.*  
*Hebeloma glutinosum.*  
*H. mesophæum.*  
*Flammula flavida.*  
† *F. connisans.*  
*F. ochrochlora.*  
*Naucoria conspersa.*  
† *Crepidotus alveolus.*  
*C. epigæus.*  
*Bolbitius fragilis.*  
*Cortinarius (Derm) tabularis.*  
*C. (Derm) anomalus.*  
*C. (Derm) sanguineus.*  
*C. (Tela) torvus.*  
*C. (Tela) armillatus.*  
*C. (Tela) ilipodius.*  
*C. (Hygr) castaneus.*  
*Agaricus agustus.*  
*A. campestris.*  
† *Var. pratensis.*  
*A. hæmorrhoidarius.*  
*A. comptulus.*  
*Stropharia squamosa.*  
*Also var. thrausta.*  
*S. hypsipoda.*

*Hypholoma pyrotichum.*  
*Panæolus sphinctrinus.*  
*P. fimicola.*  
*P. ericæa.*  
*Psathyra pennata.*  
† *Coprinus fimetarius.*  
*C. lagopus.*  
† *C. Gibbsii.*  
† *C. ephemerus.*  
*C. hemerobius.*  
*Gomphidius viscidus.*  
*Paxillus lepista.*  
*Hygrophorus (Camar.) bicolor.*  
*H. (Hygro.) calyptæformis.*  
*H. (Hygro.) unguinosus.*  
*H. (Hygro.) nitratus.*  
*Lactarius (Piper) involutus.*  
*Russula furcata.*  
*R. cutefracta.*  
*R. fætens.*  
*Marasmius erythropus.*  
*M. Hudsoni.*  
† *M. polyadelphus.*  
*Lentinus cochleatus.*  
*Boletus vaccinus.*  
*B. crassus.*  
*Polyporus elegans.*  
*P. intybaceus.*  
*P. sulphureus.*  
*P. mollis.*  
*P. nidulans.*  
*P. lacteus.*  
† *P. epileucus.*  
*P. cæsius.*  
*P. fragilis.*  
*Fomes ulmarius.*  
*F. ferruginosus.*  
*Poria mollusca.*  
*P. sanguinolenta.*  
*Dædalea unicolor.*  
*Hydnum alutaceum.*  
*Craterellus cornucopioides.*  
*Hymenochæte tabacina.*  
*Cyphella Pimii.*  
*Thelephora caryophyllea.*  
† *T. palmata.*  
*Clavaria muscoides.*  
*C. abietina.*  
*C. dissipabilis.*  
† *C. acuta.*  
*Typhula muscicola.*  
*Hirneola auricula-judæ.*  
*Calocera cornea.*  
† *C. stricta.*  
*Melampsora circææ.*  
*Uromyces rumicis.*  
† *Puccinia pimpinellæ.*  

On *Myrrhis odorata.*

*P. saniculæ.*  
*P. taraxaci.* On *Taraxacum.*

<i>Puccinia oblongata.</i> On.L. cam-	† <i>Phacidium multivalve.</i>
<i>Nectria coccinea.</i> [pestris.	<i>Pilaira anomala.</i>
<i>Hypoxyton coccineum.</i>	<i>Spinellus fusiger.</i>
<i>Eutypa spinosa.</i>	<i>Peronospora parasitica.</i>
<i>Diaporthe rostellata.</i>	<i>P. ficariæ.</i>
<i>Sordaria curvula.</i>	† <i>Phoma longissimum.</i>
<i>Raphidospora acuminata.</i>	<i>Septoria rosarum.</i>
<i>Heptameria doliolum.</i>	<i>Monilia fructigena.</i>
<i>Didymosphærella conoidea</i> Wiessl.	† <i>Rhinotrichum niveum.</i>
<i>Helvella ephippium.</i>	<i>Periconia pycnospora.</i>
† <i>Geopyxis cupularis.</i>	† <i>Fusicladium dentriticum.</i>
<i>Peziza repanda.</i>	<i>Stilbum tomentosum.</i>
<i>P. succosa.</i>	<i>S. vulgare.</i>
<i>P. pustulata.</i>	<i>Graphium flexuosum.</i>
† <i>Humaria deerrata.</i>	
<i>Lachnea dalmeniensis.</i>	
<i>L. hemispherica.</i>	
<i>L. albo-spadicea.</i>	
<i>Dasyscypha ciliaris.</i>	
† <i>Erinella Nylanderi.</i>	
<i>Cyathicula coronata.</i>	
<i>Helotium ferrugineum.</i>	
<i>H. ochraceum.</i>	
<i>H. lutescens.</i>	
<i>H. virgultorum.</i>	
Var. <i>fructigenum.</i>	
<i>H. epiphyllum.</i>	
<i>Mollisia fallax.</i>	
† <i>Pseudopeziza albella.</i>	
<i>Orbilia luteo-rubella.</i>	

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MYXOMYCETES—

*Clathroptychium rugulosum.*  
*Cribraria macrocarpa.*  
*C. argillacea.*  
*Arcyria incarnata.*  
*A. cinerea.*  
*Didymium farinaceum.*  
*D. spumarioides.*  
*D. effusum.*  
*Craterium confusum.*  
*C. aureum.*  
*Badhamia varia.*  
*B. panicea.*

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**Notes on the Origin of Kingston-upon-Hull,** and of the Port of Hull, also on the Camin Charter, the Meaux Register (including the 'old' River Hull Tradition), and Glimpses of Mediaeval Hull, by **J. Travis-Cook.** London: A. Brown & Sons. 68 pp., 2/-.

In this book Mr. Travis-Cook, who has written much in past years in reference to old Hull, offers 'the latest, the best, and the ripest fruits (for what they may be worth) of much labour in this particular vineyard.' He would take back Hull's history some six hundred years earlier than would most writers; though he is admittedly indulging in 'historic imagination.' He concludes that 'our founders were a little band of eight families; farmers as well as warriors, possessing one plough of eight oxen.' This may be so, or it may not; but without any evidence it is difficult to say. When, however, we are told 'we may even go a step further, and conceive the existence of a prior British hamlet or fortress on the spot where our founders landed,' we must cry halt, or that one step will lead us into a hole. In British times, as is amply proved by geological evidence, this area was under water, and even in Roman times the land around what is now Hull was not habitable. Whilst we admire the author's patriotism in endeavouring to make the old town of Hull even more ancient, we can only regret that his ideas are unsupported by evidence. His sketch-maps, also, shewing Hull in the VI. and XIV. centuries, though ingenious, are not convincing. Still, these 'ripe fruits' are to be eaten, and if we don't swallow too many, no great harm will result. But there is much other interesting information in the book dealing with Hull in later times, when (the silt having formed) the author is on firmer ground. It is well produced and cheap.

## SOME BRITISH EARTHMITES.

*Trombididiæ.*

(PLATE XVIII).

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 C. F. GEORGE, M.R.C.S.,  
*Kirton-in-Lindsey.*


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*Ottonia valga*.—This very interesting little creature has several marked characteristics. I have no doubt that when alive it is a very handsome mite. I have met with only one specimen, however, which was found by Mr. Wm. Evans, of Edinburgh, who took it in moss, at Aberfoyle, in 1905. and sent it to me in February 1909. All colour had then disappeared from long action of the preservative fluid. It is rather small in size, and almost as broad as it is long; Mr. Soar's figure makes it appear as quite oval. This, however, is probably the result of slight pressure by the cover glass, as when I first examined it without any pressure, it was rather wider at the shoulders than elsewhere, as is commonly the case in most of these mites. Mr. Soar gives the length as 0.96 mm., and breadth, 0.64 mm. The two front legs are longer and stronger than the others, the last joint is much the largest. It is flattened from side to side, and somewhat quadrangular (see figure *c*), it is also turned outwards, making the creature look 'splay-footed'—hence the name *valga*. It is possibly the mite described and figured by Koch (15.24) as *Trombidium plancum*. The hairs or papillæ of the body are remarkable, being spindle shaped and pectinated, and also provided with a number of rather long fine hairs, requiring a fairly high power, and good light to see them perfectly (see figures *c*, *d* and *f*.) Each hair or papilla is set in a socket, like a candle in its stick. The edge of the flange is, however, plain, not cut into teeth, like some of those belonging to 'bullata' or conifera. The two claws at the end of the fourth internode of the palpus are nearly equal in size and thickness (figure *b*). There is also a row of short, thick hairs or spines on one side resembling a comb (see fig. *b*). The crista also (fig. *g*) differs considerably from any previously figured by me.

*Ottonia clavata*. This is one of the largest and most beautiful mites of this division. It is the colour of red sealing-wax, and in shape resembles *T. fuliginosum*. The eyes are very prominent, and situated at each side of the cephalothorax. The front legs, as usual, are the longest and strongest, and have

the last joint somewhat clubbed, as in figure *a*. Many of the hairs on the legs and palpi are beautifully feathered (see figure *f*). The fourth joint of the palpus terminates in two claws (figure *f*). The papillæ on the dorsum are not crowded, and in structure are very peculiar, reminding one of a savage war-club. They are enlarged towards the distal extremity, and look as if studded with spikes (see figures *c*, *d* and *e*). Even when mounted in balsam they retain much of their colour, which adds greatly to their beauty. I am sorry to say that I have only seen one specimen of this mite, which deserves more detailed description. I think, however, that the peculiar papillæ are sufficient to differentiate it from other members of the family. It was sent to me in December 1907, by Mr. W. Evans, of Edinburgh, who found it, I believe, in April 1906.

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**Text-book of Petrology**, by **F. H. Hatch**. London: Swan Sonnenschein. 5th edition, 1909. 404 pp., 7/6 net.

The scope of this work is perhaps best described by its sub-title—'A summary of the modern theories of Petro genesis, a description of the rock-forming minerals, and a synopsis of the chief types of the igneous rocks and their distribution as illustrated by the British Isles.' So many additions have been made to our knowledge of British Petrology in recent years that the present edition of Hatch's well-known text-book has been practically entirely re-written, and besides several new illustrations, the present volume contains many new features. These include a fuller list of references to literature, more complete lists of chemical analyses, the separation of the part dealing with the classification of rock-types from that dealing with their distribution, and a Table for the Determination of the Chief Minerals of Igneous Rocks in thin section. There is a very good index.

**Radioactivity and Geology**, by **Prof. J. Joly**. London: Constable & Co. 287 pp., 7/6 net.

Most of those who were fortunate enough to squeeze in the crowded lecture theatre at the Dublin Meeting of the British Association, and hear Prof. Joly's presidential address to Section C., as well as those who were left outside, hoped that his address would eventually appear in a more extended form. This hope has been realized, and the book is before us. There is no doubt that the author takes a foremost place in the application he has made of the recent discoveries in radioactivity, to geological science. It is quite possible that geologists have been too hasty in forming generalisations as to the influence of the properties of radioactive elements upon such subjects as the age of the earth, etc., and even Prof. Joly admits that his book contains much that is speculative. Still, if his observations and conclusions were not published, they could not be discussed and criticised, and progress would be slow. As it is his views are carefully and clearly expressed, and no one more than the author will welcome a conscientious and serious criticism of the ideas put forward. No doubt as time goes on, views will change as to the importance of the radioactive elements in the history of our planet; but, nevertheless, Prof. Joly will always receive credit for his pioneer work in a difficult direction. Amongst the subjects discussed are the foundations of Radioactive Science; Underground Temperature and Radioactivity, the Instability of the Earth's Crust; Mountain Structure; the Interior of the Earth; the Age of the Earth, etc.

## THE ANNELID FAUNA OF WORCESTERSHIRE.

Rev. HILDERIC FRIEND,  
Great Malvern.

THOUGH it is twenty years since I began the study of our Annelids, and I have during that period made note of everything which has come in my way respecting County Records, I find that I have never yet seen a single allusion to the species which exist in Worcestershire. I can hardly believe that the subject has been absolutely neglected ; and should be glad to learn that someone connected with the different Natural History Societies of the County has published lists in some of the local publications. Should such lists exist, my records will be supplementary ; but if there are no published reports, I shall be happy in being able to lead the way, by publishing the results of my own observations. The County of Worcester is undoubtedly rich in species, and my lists already contain some records which are of more than ordinary interest.

Our native Annelids fall into several groups. The best known section is that which contains the larger earthworms. Next to this comes the group which includes the fresh water species, such as the different species of *Tubifex* and their allies. Then we have the large class of white worms or *Enchytraeids*, which are found on land, by the side of water, or sometimes even leading a purely aquatic life. In addition to these we have a fourth group, consisting of very minute water-worms, which do not live in the mud like the *Tubificidæ*, but are usually found living a free life among the algæ and weeds. These include the pretty and interesting *Nais* and its congeners.

We will begin with the best known. It was with these that Darwin was concerned when he wrote his 'Vegetable Mould,' but, whereas he assumed that the British species of earthworms amounted to fewer than ten, we now have a list of indigenous species numbering thirty at least. For a long time all the earthworms were known by the generic name of *Lumbricus*, which Linnæus employed ; but Savigny in 1826 used the term *Enterion*. As knowledge progressed, it was found that there were different genera, and the name *Allolobophora* was adopted for a group which displayed a form of head whose insertion into the peristomium differed from that of the type. A third genus, containing worms of a semi-aquatic nature, was also separated off, and named *Allurus*, on account of the different form of its tail.

More recent research has led to the further splitting up of the genus *Allolobophora*, so that we have learned to use such terms as *Dendrobæna*, *Eophila* and *Helodrilus*, *Octolasion*, *Hypogaeon* and *Aporrectodea*, *Eisenia* and *Bimastus*; while *Allurus* has been changed to *Eiseniella*. If these changes are at times confusing, they at any rate serve to indicate that our knowledge of the subject is more extensive than of old, while they also remind us that the student of system finds wide differences between species which seemed at one time to be very nearly related.

So far as our native species of *Lumbricus* are concerned, they are clearly defined and readily identified. They may be said to consist of terrestrial annelids of a purplish colour, with somewhat flattened tails, a head or prostomium which entirely bisects the first segment or peristomium; and having a girdle which is uniformly composed of six segments, the four innermost of which carry the *tubercula pubertatis*. The male pore is on the fifteenth segment, and is conspicuous in some species, but obscure in others.

There are but five species of *Lumbricus* at present known in the British Isles, and one of these (*Lumbricus friendi* Cognetti) which I first discovered and described some years ago (as *Lumbricus papillosus* Friend), is at present known 'only in the South of Ireland in the British Isles, and has only been found elsewhere at considerable elevations in the Pyrenees and the Alps.'\*

The remaining species, four in number, are all found in Worcestershire. I have not made an exhaustive survey of the county, and cannot therefore give a long list of localities; but this hardly seems necessary in the case of species which are so generally and widely distributed. It may be well, perhaps, to add the characteristics of each species.

I. *LUMBRICUS TERRESTRIS* L., is the largest English species of the true *Lumbrici*. It sometimes attains a length of six or more inches, and preserved specimens range from six to fifteen centimetres. Eisen speaks of examples from Scandinavia, which are twice that length, and have more than six segments to the girdle. He is a good observer, but I fancy his record was an early one, made when there was much confusion between this species and *Allolobophora longa* Ude. I have never, in all

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\* Southern, *Contributions towards the British and Irish Oligochæta*, 1909.

my experience, seen a genuine *Lumbricus* with more than six girdle segments, and these extend in the present instance from segments 32 to 37, the tubercula being on segments 33 to 36. It may be graphically presented in the form of a fraction, thus— $\frac{32-37}{33-36}$ . The male pores on the fifteenth segment are connected with prominent papillæ.

Found around Malvern, known to every part of the British Isles, and widely distributed in Europe (Italy, France, Austria, Hungary, Sweden, Norway, Denmark, etc.), and North America. See Rosa, *Revisiione dei Lumbricidi*, p. 25.

2. *LUMBRICUS RUBELLUS* Hoffmeister. Considerably smaller than the former, but similar in colour and general appearance, so that robust forms might easily be confused with the smaller forms of *L. terrestris* L. But they are instantly differentiated by means of the girdle and male pores. In the case of *L. rubellus* the pores cannot be seen, while the fractional index for girdle and tubercula is  $\frac{27-32}{28-31}$ . In Northern Europe, this species also is said to attain a much larger size than with us, but the girdle segments do not change.

Found around Malvern; general distribution as in the case of *L. terrestris* L.

3. *LUMBRICUS FESTIVUS* Savigny. In size and general appearance hardly distinguishable from *L. rubellus*. The male pores are, however, prominent, and the index for girdle and tubercula is  $\frac{34-39}{35-38}$ . Hence the two are at the extremes of the line of development. This will be best understood by reference to the following table, which gives a bird's eye view of the segments on which the tubercula are situated. For finding the girdle one has only to add a segment to each end.

SPECIES.	Segments carrying tubercula <i>pubertatis</i>															
<i>Lumbricus rubellus</i> Hoffmeister .. ..	28	29	30	31	.	.	.	.	.	.	.	.	.	.	.	.
„ <i>castaneus</i> Savigny .. ..	29	30	31	32	.	.	.	.	.	.	.	.	.	.	.	.
„ <i>meliboeus</i> Rosa .. ..	.	.	30	31	32	33	.	.	.	.	.	.	.	.	.	.
„ [ <i>Tyrtæus</i> Savigny .. ..	.	.	.	31	32	33	34	.	.	.	.	.	.	.	.	.
„ <i>studerii</i> Ribaucourt .. ..	.	.	.	.	.	32	33	34	35	.	.	.	.	.	.	.
„ <i>terrestris</i> Linnaeus .. ..	.	.	.	.	.	.	33	34	35	36	.	.	.	.	.	.
„ <i>friendi</i> Cognetti .. ..	.	.	.	.	.	.	.	.	34	35	36	37	.	.	.	.
„ <i>festivus</i> Savigny .. ..	.	.	.	.	.	.	.	.	.	35	36	37	38	.	.	.

This latter worm has had a somewhat romantic history. It was first named *Enterion festivum* by Savigny in 1826, and eleven years later Dugès gave particulars respecting it under the name which it now bears. It was then lost to sight for upwards of half a century. At last I discovered it in England, where it had never been recognised before, except very doubtfully from Berwick-on-Tweed (Johnston's 'Catalogue of Worms,' p. 59). As it was apparently new to Britain and to science, I named it *Lumbricus rubescens* ('Nature,' 1891, p. 273). It was afterwards re-discovered on the Continent, and is now placed beyond all doubt. I found it some years ago in association with *L. rubellus*, and gave some account of my observations in a paper ('Naturalist,' October 1892) entitled 'Hybridity among Worms,' to which Dr. Rosa ('*Revisione dei Lumbricidi*,' p. 27), makes special allusion. The fuller history of this interesting species may be read in various journals, including the issues of the 'Bradford Scientific Journal' for the present year.

Found at Malvern; and also recorded for various parts of England, Wales, and Ireland, by myself. I have also received it from Normandy. It is abundant around Paris.

4. *LUMBRICUS CASTANEUS* Savigny, is the smallest of the true *Lumbrici* in Great Britain. In colour and shape it is similar to the last, but if the girdle segments are our guide, it comes next to *L. rubellus*, Hoff., the fractional index being  $\frac{28-33}{29-33}$ . It is very active, and has a habit of gliding rapidly backwards when wanting to avoid danger.

It is greatly to be hoped that further research in unexplored parts of Britain may bring to light other genuine species of *Lumbricus*. *L. studeri* Rib. has never been reported, though one does not see why it or *L. melibæus* Rosa, should not be found. The notices of *L. tyræus* Savigny still need confirmation.

It is only possible for me, in the present paper, to refer to one other species, as it is necessary, for the sake of clearness, to reserve all the *Allobophoras* for treatment together. I allude to *Allurus*, a semi-aquatic worm which occurs everywhere in Great Britain, and is liable to considerable variation. We have undoubted evidence of the existence of more than one species in these islands, but so far, the material collected has been insufficient for the purposes of science.

5. *ALLURUS (EISENIELLA) TETRAEDRUS* Savigny. This little

Naturalist,



worm was first described by Savigny as *Enterion tetrædrum*, on account of its square tail (whence also the name *Allurus*). It was kept under notice thenceforth by all the authorities such as Dugès, Grube, Eisen, Oerley, Rosa, and others ; but, though recorded by Johnston in 1865, was reported as new to Britain in 1888. In that year it was found in Dorset, and as the discoverer shortly afterwards became my neighbour and personal friend in Carlisle, his narration induced me to take up the pursuit. Beddard of London, and Benham of Oxford were just then giving the subject attention, and it may be said that a new era in the study of British Annelids dates from that period. Beddard has continued the work ever since, and in 1895 produced his magnum opus: a 'Monograph of the Oligochæta.' Rapid strides have been made since that year, so that if the work were brought up to date, it would probably contain twice as many species, while the margins would have to be wide enough to receive as many more.

*Allurus* differs materially from *Lumbricus* in externals. The type is from one to two inches in length, usually a dirty brown, but varying much in colour, with a square tail, the male pores on the thirteenth segment, the girdle extending from the twenty-second to the twenty-seventh, or thereabouts, and the tubercula from the twenty-third to the twenty-sixth, represented thus— $\frac{22-27}{23-26}$ .

Found at Malvern, Powick, and elsewhere. It is to be met with wherever there is water, and is not only recorded for every part of the British Isles where search has been instituted, but also for almost every country in Europe, for Teneriffe, Valparaiso, and elsewhere.

In my next contribution the different species of *Allolobophora* at present known to occur in Worcestershire will receive attention. The white worms and water worms will be reserved for a later paper.



**Memorials of Charles Darwin.** London. 50 pp., 6d.

It may quite possibly never again happen that so many interesting memorials of Charles Darwin will be gathered together as were recently at the British Museum (Natural History). The catalogue of these memorials, issued at the small price of 6d., is therefore a most valuable record. The guide book has been prepared by Dr. W. G. Ridewood, under the superintendence of Dr. Sidney F. Harmer, who has written an interesting Preface. Over two hundred and fifty exhibits are minutely described; the specimens being exhibited in twenty-four cases.

## THE CHEMISTRY OF SOME COMMON PLANTS.

P. Q. KEEGAN, LL.D.,

Patterdale, Westmorland.

HAIR MOSS (*Polytrichum commune*).—This plant forms tufts and cushions of pure greenery in woods and on open land where the heather grows. The chemistry of mosses as compared with those of ferns and fungi, is decidedly tame and bald—a circumstance that is evidently connected with the structure of their cells, especially of their cell-walls. Most, or at least a great deal of their chemical constituents seem to be absorbed, grasped in, or bound up in a very intimate manner with the cellulosic skeleton of the cell. On 11th June, a dried gathering of the plant in fruit yielded to boiling benzene about one per cent. of a white, waxy matter. The alcoholic extract was acid and faintly bitter, and had no tannoid or tannin, it gave a red-brown colour with iron alum, and very small precipitates with bromine water, and with acetate of lead; also it gave reactions of cane-sugar, while a red-brown substance was extracted by ammonia from the residue insoluble in water, which consisted mainly of a resinous substance dissolving in sulphuric acid, with a brown colour passing to a splendid violet. There was no extractible proteid or starch; there was, however, a considerable quantity of mucilage taken up by dilute caustic soda solution, and a substance soluble in amyl alcohol, which dissolved brown in sulphuric acid. The ash of the plant was very small in quantity, and contained 41.9 per cent. soluble salts, 16.3 silica, 4.5 lime, 11.4 oxide of iron, 4.9  $P^2O^5$ , 5.1  $SO^3$ , with some manganese. The above analysis recalls that of lichens rather than that of ferns or mushrooms, notwithstanding the total absence of the highly tinctorial lichen acids and high quinone derivatives associated therewith. In fact, it occurred to me during and in view of the analyses that mosses must be a class of plants specially created, so to speak, and absolutely distinct from all other members of the vegetable kingdom. Their cell-wall, as aforesaid, is the chief seat of the chemical constituents. It contains no lignin, but has pectin, and only yields cellulose reactions after boiling with dilute alkali; hence the soluble carbohydrates are here converted with special facility into insoluble ones, and these again into cellulose. By prolonged boiling under pressure in dilute caustic soda, Czapek obtained a phenolic body, which he named sphagnol,

and also a tannoid or tannin which is iron-greening and precipitates gelatine; both of these constituents being originally present in the cell-wall as compounds (esters) of cellulose. The unparalleled local, geographical, and climatic distribution of mosses is evidently indissolubly connected with the marvellous structure, and constitution of the skeletal framework of the cell.

COMMON REED (*Phragmites communis*)—This plant forms a sort of hedge by the margins of lakes and in marshy places. 'The wavy swell of the sighing reeds' is a spectacle familiar to the wanderer in these haunts. This grass belongs to the tribe Festuceæ, which also includes many of the abundant and familiar species of our meadows and pastures. The rootstock is thick, jointed, and extremely creeping, it contains much sugar, is very nutritious, and has 6 per cent. pure ash yielding 57.7 silica according to Fittbogen. The leaf is traversed by a large number of nerves highly sclerified and lignified, and is protected also by bands of sub-epidermal fibres, with very thick walls; the organ exhibits great power of transpiration. On 20th August the dried blades yielded about 2 per cent. wax, with much carotin; this wax forms a fine closely adherent layer on the lower epidermis, and contains a solid hydrocarbon, so that it rapidly separates from boiling alcohol; little or no chlorophyll was withdrawn from the leaf by boiling benzene, or by boiling alcohol alone, it is only when the leaf is first extracted by benzene and then boiled in alcohol that the green pigment is dissolved in great quantity, depth, and intensity. The alcoholic extract (after benzene) contained a distinctive quantity of a tannoid which seems to be quercetin or fisetin, it exhibits great tinctorial power, the reactions with iron, lead, and alum salts being unusually clear and brilliant; there was no tannin or free phloroglucin, but cane-sugar was indicated, and a large quantity of a resinous substance which dissolved in sulphuric acid with a deep brown colour passing to a splendid violet. There was a good deal of pectosic mucilage and reserve starch (unextractible), and crude fibre (52.4 per cent.), but no oxalate of calcium. The ash of the leaf amounted to 7.4 per cent., and contained 20 per cent. soluble salts, 45.4 silica, 10.4 lime, 4.8  $P^2O^5$ , 3.7,  $SO^3$  and 4 chlorine; there was a good deal of manganese, but no soluble silica or carbonates. The foregoing analysis throws clear light on the phenomena of grassy vegetation. We see how thoroughly the chlorophyll is 'protected'

by the solid wax from the attack of external agencies. The wax also serves to 'protect' the leaf from the withering effects of excessive transpiration. The chlorophyll itself is of extraordinary depth, and richness of tint, notwithstanding the enormous amount of silica in the ash, which is indicative of imperfect and exhausted vegetative power. There are no mycorrhiza in or on the roots, and there is a strong excretion of water from the leaves, and with it silica and salts of lime. The process of deassimilation does not seem to surpass the tannoid and resin stage, no true tannin being produced, except perhaps a little in the floral parts. The soluble carbohydrates pass to lignin with considerable facility, and the absence of acids indicates the comparative immobility of the albumenoids.

**TUFTED VETCH** (*Vicia cracca*).—This tall conspicuous plant, crowned with a rich purplish blue raceme of flowers, springs up in hedges, waste places, and amid the grassy herbage of open sunny fields and pastures. The chemistry is comparatively tame and uninteresting. The official analysis of the dried plant reports 27.4 per cent. albumenoids, 1.4 fatty matter, 20 fibre, and 6.8 ash. On 18th July, the dried over-ground parts contained 1.7 per cent. of carotin and wax, with no glyceride. The alcoholic extract seemed to have traces of a tannoid like luteolin, and also some alkaloidal substance, a resinous matter, and a little cane-sugar and citric acid; there was no tannin, glucose, or bitter principle. There was much mucilage, and oxalate of calcium, but no extractible proteid or starch. The ash amounted to 6.8 per cent., and contained 19 per cent soluble salts, 2.2 silica, 40.6 lime,  $4\text{P}^2\text{O}^5$ , 2.51  $\text{SO}^3$ , and 2.2 chlorine; there was a little manganese and very much insoluble carbonate. Altogether the analysis is tame and bald; the chief feature being the paucity or absence of benzene derivatives, and the presence of an abundance of lime. It would seem that the totality of the tannic chromogen was concentrated in the floral parts, but the pigment thereof is by no means pure; it cannot be compared with that of the Cranesbills, for instance, although like the latter, it forms remarkable pure blue compounds with the organic salts of manganese. The black or olive shade of the seeds seems to be due to tyrosin.

**GARLIC HEDGE-MUSTARD** (*Alliaria officinalis*).—This fine plant flourishes under hedges and in shady waste places. In the first year the stem is very short, and the root becomes fleshy

with the starchy reserve materials then stored up; in the following year vegetation is resumed very early, and the stem now grows very rapidly, the flowers appear soon, and the root reserves are consumed. The whole plant when bruised emits a strong smell of garlic, due to the action of the ferment myrosin on a glucoside yielding sulphide and sulphocyanide of allyl. On 24th May, the whole dried leaves yielded 2.7 per cent. of wax and carotin with a little fat-oil, but no resin; the alcoholic extract contained a red-brown substance, whose solution with iron salts gave a nearly black colour, with chloride of tin a bright yellow colour, and with iodine a deep violet flocculent precipitate which seems to indicate a derivative of pyrogallol, perhaps sinapin or sinapic acid; there was only a little mucilage and no sugar of any kind, and very little extractable starch. The ash of the overground parts yielded 56.4 per cent soluble salts, 3.1 silica, 14.8 lime, 3.5 magnesia, 9.5  $P^2O^5$ , 12.1  $SO^3$ , and 6.3 chlorine; there was only a little iron, manganese, or carbonates. The analysis indicates a strange fixity of the albumenoids and the carbohydrates; and this fact seems to account largely for the invariability of the plant under the influence of culture, and its incapability of forming hybrids with nearly allied species.

LESSER CELANDINE (*Ranunculus ficaria*)—This is Wordsworth's favourite flower, and therefore worthy of special reverence by all scientists who revere the poet who shunned the town and clung to the country. The subterranean organs (tubers) are morphologically comparable to those of certain Orchids, and likewise have endophytic mycorrhiza; they contain an irritant camphoraceous substance (anemonal), also starch, cane-sugar in August, glucose and other sugars in February. On 16th May, the dried leaves and petioles contained 1.2 per cent. of wax, with a good deal of carotin and traces of fat-oil; also a tannoid yielding the reactions of luteolin, some glucose and cane-sugar, a little resin, but no saponin or free phloroglucin; also much pectosic mucilage and starch, with a little oxalate of calcium and proteid; the ash amounted to 13.7 per cent. in dry, and contained 61.2 soluble salts, 6.8 silica, 9.2 lime, 2.2 magnesia, with a little manganese, 3.5  $P^2O^5$ , 4.4  $SO^3$ , and 12.8 chlorine; there was very much soluble carbonate. The carotin which tinges the corolla does not occur in a granular form; the epidermal cells contain a highly refractive yellow oil, and the subepidermal layer is densely

filled with minute starch-granules ; the nectaries are in the corolla, which also produces crystals of oxalate of calcium. In some varieties of this plant the pollen is aborted, the ovules infertile, or the embryos when produced are undifferentiated. The analysis reveals a brisk movement of the albumenoids, and a considerable productiveness of carbohydrates.



## HISTORY AND TOPOGRAPHY.

**A Manual of Roman Antiquities**, by **W. Ramsay**, Revised by **R. Lanciani**. London : C. Griffin & Co. 573 pp., 10/6.

This well-known manual has now reached its eighteenth edition ; and whilst it is very familiar to and has long been used by classical scholars, we should like to draw attention to the book as likely to prove of very great service to the increasingly large number of people who, particularly in the northern counties, are taking an interest in the Roman remains of which the country is so rich. Whilst the manual deals with almost every possible branch of Roman history, that relating to their military and naval life, their method of building encampments, etc., is of particular value. In this connection the contributions of Prof. Lanciani, who has done so much in connection with the excavations near Rome, are of extreme interest. By the use of small but clear type, with carefully placed headings, and wealth of footnotes and references, the volume is kept within reasonable compass. At half-a-guinea it is exceedingly cheap.

**The Rivers of Axholme**, with a history of the navigable rivers and canals of the district, by **G. Dunston**. London : A. Brown & Sons. 155 pp., 4to, Maps. 10/-

Those who know the keen business ability of the author may at first be surprised at the fact that he has turned antiquary, and written a book. But it is soon apparent that there is method in his — work ; and whilst it contains some most useful and most valuable information, we find he has soon descended from the peat to the coal measures ; and from facts about the old form of Hatfield Chase to figures bearing upon the workable coal which undoubtedly will some day entirely change the aspect of this rare tract of natural country. Mr. Dunston first tackles Abraham de la Pryme, who was gifted with a powerful imagination, and then quotes the Survey Memoirs and numerous other authorities in reference to the geological history of the area. He has also unearthed a number of very interesting plans shewing the condition of Hatfield Chase and its adjoining watercourses in the sixteenth and seventeenth centuries. These have been reproduced in a way that is all that can be desired, and in themselves are of great historical value. After dealing with the early history of the Island ; Axholme during the middle ages ; before and after the drainage ; he deals in turn with the history of each of the various navigable rivers and canals in the district ; but these chapters are of most interest from a commercial standpoint. There are some valuable appendices, dealing with XVIth century enquiries, Vermuyden's agreement with Charles I., Smeaton's report, etc. Of peculiar interest is a reproduction of a fine painting of ' King Charles I. killing deer driven into Thorne Mere.' This shews the way in which some hundreds of deer were driven into the lake by beaters, and were then surrounded by about fifty boat-loads of ' sportsmen,' who simply butchered the helpless animals. Truly a kingly sport !

# ON THE GEOGRAPHICAL DISTRIBUTION OF MOLLUSCA IN SOUTH LONSDALE.

REV. C. E. Y. KENDALL, B.A., J. DAVY DEAN, AND  
W. MUNN RANKIN, M.Sc., B.Sc.

(Continued from page 381).

*Clausilia bidentata parvula* Turton. Associated species :—

<i>Vitrina pellucida</i> Müll.	<i>Pyramidula rotundata</i> Müll.
<i>Vitreæ lucida</i> Drap.	<i>Helix hortensis</i> Müll.
„ <i>cellaria</i> Müll.	<i>Pupa cylindræa</i> da Costa.
„ <i>alliaris</i> Miller.	<i>Cochlicopa lubrica</i> Müll.
„ <i>pura</i> Alder.	

This form differs from the true *bidentata* in habit and in nature of habitat, and may well prove to be like *C. rolpheii* almost subterranean. It is found with the *Vitreæ* under the loose mossy stones in the dry upper wood.

*Limax cinereo-niger* Wolf. Associated with :—

<i>Agriolimax agrestis</i> L.	<i>Hygromia hispida</i> L.
<i>Arion hortensis</i> Fér.	<i>Pupa cylindræa</i> da Costa.
<i>Vitreæ alliaria</i> Miller.	<i>Cochlicopa lubrica</i> Müll.
<i>Pyramidula rotundata</i> Müll.	

The above is a sub-association connecting with the one just given, and is characteristic for the loose stones lying among the dry carpet of 'Yew-needles' and Holly leaves, as distinct from the luxuriant moss-growth under the Ash.

Sub-section—HAZEL AND ASH COPSE.

Dominant—*Pomatias elegans* Müller. Associated species :—

<i>Vitrina pellucida</i> Müll.	<i>Helix hortensis</i> Müll.
<i>Vitreæ cellaria</i> Müll.	<i>Hygromia rufescens</i> Penn.
„ <i>nitidula</i> Drap.	<i>Ena obscura</i> Müll.

This species, restricted in Britain to the Calcareous soils of England and Wales, reaches at Meathop one of the most northerly stations. As in the case of *Clausilia parvula* (Turton), the period of hibernation is an extended one, usually from Mid-October to the first week in May. Its habitat is described by Reeve as being chiefly in the vicinity of water, not in wet places, but at the roots of shrubs near the sea coast. At Arnside and Silverdale, it is abundant on the Hazel-covered slopes which face the shore, but it is equally abundant in the Hazel and Ash copses near Haweswater. We have also taken this species in abundance on the chalk in Sussex, where it occurred on a dry bank sheltered by a Hazel copse.

LIMESTONE PAVEMENTS.

Dominant :—*Helix nemoralis* L. Associated species :—

<i>Arion ater</i> L.	<i>Hygromia rufescens</i> Penn.
<i>Agriolimax agrestis</i> L.	<i>Helix aspersa</i> Müll.
<i>Pyramidula rupestris</i> Drap.	<i>Pupa cylindracea</i> da Costa.

This species, though by no means restricted to calcareous soils, is characteristic of the limestone pavements. On the

*Hygromia rufescens* Pennant. Associated with:—

<i>Arion ater</i> L.	<i>Vitrea nitidula</i> Drap.
<i>Agriolimax agrestis</i> L.	<i>Helix hortensis</i> Müll. (rare).
<i>Vitrea cellaria</i> Müll.	„ <i>nemoralis</i> L. (locally).
„ <i>alliarum</i> Miller.	<i>Cochlicopa lubrica</i> Müll.

This species might at first sight appear to be universal, but apart from the neighbourhood of gardens, and the influence of such artificial habitats, its place would seem to be on the margins of the Oak-Birch woods of a somewhat damp type, occurring plentifully among the nettles and brambles.

*Vertigo alpestris* Ald. Associated species:—

<i>Vitrea pellucida</i> Müll.	<i>Pupa cylindracea</i> da Costa.
<i>Vitrea alliarum</i> Miller.	<i>Vertigo pusilla</i> Müll.
<i>Euconulus fulvus</i> Müll.	<i>Sphyradium edentulum</i> Drap. (rare).
<i>Hygromia rufescens</i> Penn.	<i>Clausilia bidentata</i> Ström.
<i>Cochlicopa lubrica</i> Müll.	

This species is characteristic of the marginal wood, and while associated constantly with *V. pusilla*, it is evident that its true place is here rather than in the Ash woods. Its centre of distribution is further north. It is the *Vertigo* of the Lake District, while *V. pusilla* gradually disappears in that direction, ranging further south, however, than *V. alpestris*. While abundant in the Limestone area, it is even more abundant in the Silurian region. It is thoroughly well distributed, and where it occurs is found plentifully in damp situations on the low mossy walls.

*Zonitoides excavatus* Bean. Associated with *Pyramidula rotundata* Müll. (Dominant), and:—

<i>Limax arborum</i> B. Ch.	<i>Vitrea nitidula</i> Drap.
<i>Agriolimax lævis</i> Müll.	„ <i>crystallina</i> Müll.
<i>Arion subfuscus</i> Drap.	<i>Euconulus fulvus</i> Müll.
<i>Vitrea pellucida</i> Müll.	<i>Punctum pygmaeum</i> Drap.
<i>Vitrea cellaria</i> Müll.	<i>Cochlicopa lubrica</i> Müll.
„ <i>alliarum</i> Miller.	

This species is characteristic of the purer Oak woods of a somewhat damp type, and of which this association is typical. It is, however, not so abundant in this district as it is in the Oak woods of the Coal Measures in South Lancashire and Cheshire, in which the characteristic flora is blue-bell, soft grass and bracken.

(b) *Dy*: Heathy Section.

Beyond an occasional *Pyramidula rotundata* there are no conchological features that can be at present given.



lower ground in the district it is extremely local and rare. The association is that of a woodland fauna of a drier type merging on pasture.

Dominant :—*Balea perversa* L. Associated species :—

<i>Pyramidula rupestris</i> Drap.		<i>Clausilia bidentata</i> Ström.
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This species, rarely taken here on trees, is abundant in the very driest positions, so abundant, in fact, as to constitute quite a feature. It occurs frequently also on high exposed walls, in clusters under the topmost stones.

## II.—THE OAK-BIRCH FORMATION.

(a) *Damp* : Grassy section.

*Vertigo substriata* Jeff.

*Acanthinula aculeata* Müll.

These two species while not associated together as a rule, are typical of the Oak-Birch woods. *A. aculeata* is one of the commonest snails of the Lake District proper, and *V. substriata* seems to be most abundant in the damp woods of the Silurian region, and is only taken locally on the Limestone. *A. aculeata* is well established also in the Oak-Birch woods of the Lune Valley.

Dominant :—*Clausilia bidentata* Ström. Associated with :—

<i>Vitrina pellucida</i> Müll.		<i>Hygromia rufescens</i> Penn.
<i>Vitrea alliaria</i> Miller.		<i>Pupa cylindracea</i> da Costa.
<i>Pyramidula rotundata</i> Müll.		<i>Cochlicopa lubrica</i> Müll.

The extraordinary abundance of this species is most noticeable, especially towards the margins of the woods. It is one which would seem to avoid the Oak-Birch woods of the Dry Heath section. In the damp Ash-Oak woods of the limestone, it is also one of the dominants and like *H. arbustorum*, there shows a Beech influence, becoming abundant again further north in Beech woods. In the purer Ash woods it is largely replaced by *C. cravenensis*, and when it does occur tends towards the var. *suttoni* Westl.

*Helicigona arbustorum* L. Associated species :—

<i>Arion ater</i> L.		<i>Pyramidula rufescens</i> Penn.
<i>Limax maximus</i> L.		<i>Helix hortensis</i> Müll.
„ <i>marginatus</i> Müll.		

The true habitat of this species is the wood-margins of the northern Silurian region. It is very abundant in the damp woods of the Lake District, and in a more stunted form it extends its range to a considerable elevation. South of the Kent Valley it persists only in isolated colonies, chiefly in damp meadow grass bordering a wood slope. It is very scarce indeed on the Limestone.

## NOTES ON EAST RIDING SPIDERS IN 1909.

E. A. PARSONS AND T. STAINFORTH.

IN spite of the inclement weather prevailing during this season of 1909, the result of the work accomplished amongst spiders in the East Riding has been highly satisfactory.

Not only have 22 species been added to the local list which appeared in the 'Transactions of the Hull Scientific and Field Naturalists' Club,' (Vol. IV. part 2, 1909), but many additions have been made to the Yorkshire MS. list, which is in course of preparation by Mr. W. Falconer, of Slaithwaite; and specimens of both sexes of *Cornicularia kochii* Camb., a species new to Great Britain, have been taken on the Yorkshire shore of the Humber, and at several points on the North Lincolnshire shore. (See 'The Naturalist,' Aug. and Sept.). To Mr. Falconer we are deeply indebted for his courtesy in identifying all the species referred to in this paper.

The most fruitful source for new records, as in past years, has been the Humber foreshore and Spurn Point.

### HUMBER SHORE.

Differing in character from any other part of the Riding, the Humber shore yields several peculiar forms. The most important discovery apart from that of *C. kochii*, was *Lycosa purbeckensis*, var. *minor*, F. O. P. Camb., a notable addition to the Yorkshire list.

On a coldish day, early in May, the compilers obtained two males and one female of this species, hidden at the roots of saltmarsh plants on Saltend Common. On May 15th, another female was found in the same locality. On May 20th, a male was captured on the Humber shore between Hull and Hessle. On May 23rd Saltend was again visited, and in the bright sunshine, the species was observed running about in great numbers on the saltmarsh plants, both at this point and on the 'growths' of the Humber shore, between Marfleet Creek and Lord's Clough. On May 29th, an example of each sex was taken on the shore, between Hull and Hessle. On June 13th, a single female was captured on the clay at the Kilnsea end of the Humber side of Spurn. It seems probable, therefore, that the species occurs on the Yorkshire Humber shore from Spurn to Hessle, and possibly further west. It would be interesting to learn whether it is to be found on the Lincolnshire side of the estuary.

The form *purbeckensis* was described and figured by F. O. P. Cambridge in the 'Annals and Mag. of Nat. Hist.' Ser. 6, Vol. XV., p. 32, and has been found at Poole Harbour and other localities in the south. The var. *minor* is also described by F. O. P. Cambridge in the same journal, and was first taken in April on the shores of the Solway. The species has also been recorded from Northumberland.\*

*Lophomma subæquale* Westr. A single female of this rare species was captured on Saltend Common on September 8th.

*Araconcus humilis* Bl. was found on the Humber Bank, between Hull and Hessle, on May 29th, 2 males and 8 females in all being captured.

*Cornicularia kochii* Camb. As mentioned previously, this is an addition to the British List. The first male specimens taken in this country were found on the Hull Society's excursion to Barton, N. Lincs., on April 17th. The first Yorkshire example was a female found on the foreshore at Saltend in May. The male was found in Yorkshire for the first time on 'the shore between Brough and Ferriby, on the 22nd August, when two specimens were taken. A further male was captured at Saltend on September 18th.

#### SPURN.

From Spurn the following are additions to the previous list :

*Prosthesima latreillii* C. L. Koch. An adult female and immature examples of both sexes were found on June 13th. They occurred at the roots of the grasses on the sand dunes, their jet black hue making them very conspicuous against the yellow surroundings. This is a new record for the county.

*Lophocarenum nemorale* Bl. This, also a new Yorkshire record, occurred commonly, under drift seaweed on the Humber side of the headland, on May 30th ; female specimens only being taken.

*Prosopotheca monoceros* Wid. A female of this species was found at Spurn on the 13th of June.

*Europhrys aequipes* Camb. Mr. Falconer describes this as an excellent addition to the Yorkshire list. Examples of both sexes were taken.

#### HOLDERNESS.

(1) From the marshes of Holderness the following new records have been obtained :—

*Leptyphantès pallidus* Camb. A female was taken on the

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\* 'Naturalist,' Apr. 1902, p. 115.

Sutton Drain Bank on May 14th, and another female was obtained on a visit to Tunstall in the following month.

*Baryphyma pratensis* Bl. On May 5th a female of this species, an addition to the Yorkshire list, was taken on the Sutton Drain Bank, near the Bridge on the road between Sutton and Wawne.

Pulfin Bog, on the River Hull near Beverley, which is noted for some rare plants, has also yielded three additions to our list of local spiders, viz. :—

*Tmeticus expertus* Camb. 2 females were taken on July 7th.

*Gonylidium distinctum* Sim. On the same date a single male of this species was found. It is the only example yet taken in the county.

*Lycosa herbigrada* Bl. One male was taken running about among the marsh plants.

(2) The WOLDS of Holderness have added three species new to our list. These are :—

*Clubiona terrestris* Westr. An example of each sex was taken in Birkhill Wood, near Cottingham, on June 5th. On October 16th, one male and five females were obtained in a beech wood at South Cave.

*Microneta conigera* Bl. On June 5th two males of this spider were captured in Birkhill Wood.

*Styloctetor penicillatus* Westr. A female was taken in Birkhill Wood on June 5th.

*Tmeticus abnormis* Bl. A single male was found among dead leaves in a large beech wood near South Cave, on October 16th, 1909.

*Leptyphantus tenebricola* Wid. Of this species a male was captured in a wood near South Cave on July 5th.

*Prosopotheca monoceros* Wid. A male was taken on October 16th in a beech wood near South Cave.

In a garden in Hull, a male *Attus pubescens* Fabr. was obtained on the 28th of June.

#### DERWENTLAND.

On the Yorkshire Naturalists' Union Excursion to Market Weighton, on May 8th, 3 species were added to the local list, viz. :—

*Cnephlocotes obscurus* Bl. A female was found among heather on the road to Holme-on-Spalding Moor.

*Wideria cucullata* C. L. Koch. In the same place a female of this species was also taken.

*Hasarius falcatus* Bl. Examples of this spider were also found among the heather.

## FIELD NOTES.

### BIRDS.

**Crossbills in Durham.**—The Crossbills, in their somewhat more than ordinary migration to England this year, were first noticed in a wood in the East of the County of Durham, in the last week of June (1909). By the middle of July they were pretty frequent in the Wear Valley, near Durham and Wolsingham, and in the last week of the same month, were noticed in the woods in the Upper Browney Valley, feeding on the green cones of the larch. At the same time they were in the Derwent Valley, and also over in Hexhamshire in Northumberland.—J. W. FAWCETT, Saltley, Towlaw, Co. Durham.

**Common Scoter at Doncaster.**—On Saturday, September 18th, at about 8-30 p.m., when near the Town Moor, Doncaster, I heard ducks flying overhead, their call notes being unfamiliar to me. On the following Monday, on telling Mr. Phillips about them, he said that he had been shown a duck that had been found wounded near the place where I had heard them, and that it was a Scoter. On the 21st inst., I obtained the bird from its captor, and found it to be an adult male Common Scoter, in good plumage. It has been set up for the Doncaster Museum. The middle of September is a remarkably early date, and Doncaster a remarkable locality for such a marine species.—H. H. CORBETT.

**Cream-coloured Variety of the House Sparrow.**—The keeper from Cusworth a few days ago brought me a very interesting Sparrow. The wings, tail and sides of the neck are very pale cream colour; throat and side of head, under parts and back fawn colour, fading to pale cream colour.—H. H. CORBETT, Doncaster.

**Glossy Ibis near Doncaster.**—On Wednesday, October 27th, I saw a Glossy Ibis exposed for sale along with other wild fowl, in a game-dealer's shop. I learnt from the shop-keeper that it had come in that day from Misson, near Bawtry. It is a young bird, with the head and neck spotted. It is being set up for the Doncaster Museum.—H. H. CORBETT, Doncaster.

**Glossy Ibis at Whitby.**—A remarkably fine specimen of the Glossy Ibis was shot on the Old Hall Farm, Ruswarp, near Whitby, on October 20th. The place where it was shot is a quiet sheltered marshy spot (about a mile from the sea), where it had frequented for some days. It was an adult bird

in winter plumage, the sex, unfortunately, not being ascertained. The specimen was secured by the Whitby Literary and Philosophical Society, and the skin has been preserved and mounted for the Whitby Museum.—THOS. STEPHENSON, Whitby.

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### COLEOPTERA.

***Atomaria fimetarii* Herb. at Doncaster.**—This somewhat rare beetle has been found in considerable numbers in *Coprinus comatus* here this September. It does not seem to have been recorded for the West Riding previously, but it is interesting to note that the late W. C. Hey took it at York in the same species of fungus some years ago.—H. H. CORBETT.

***Leistus montanus* on Skiddaw.**—In the 'Transactions of the Carlisle Natural History Society for 1909' it is stated that *Leistus montanus* Steph. has not been taken recently on Skiddaw. I have therefore pleasure in recording that on August 5th, 1909, I took eight specimens of this rare beetle under stones on Skiddaw summit. They were fairly abundant, and only lack of time prevented the capture of a larger number. My identification has been confirmed, with his usual kindness, by Mr. E. A. Newbery. *Nebria gyllenhalii* Sch., swarmed in the same spot—G. B. WALSH, Middlesbrough.

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### LEPIDOPTERA.

**Abundance of *Scoparia conspicalis*.**—Last August, my brother, Mr. J. A. Butterfield, shewed me a specimen of *Scoparia conspicalis*, which he had taken in Bolton Woods, and I may add that the species has been unusually abundant this year in this district. On a single tree trunk I counted about twenty individuals.—E. P. BUTTERFIELD, Bingley.

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### HYMENOPTERA.

***Sirex noctilio* (= *S. juvencus*)** is a rare insect in the Louth District. It is therefore of interest to record that on October 7th, while looking over a collection of natural history objects, made by the children of Rev. Geo. Hall, Ruckland Rectory, my attention was drawn to a male and a female, *S. noctilio*,

Naturalist,

which the children had recently caught in the Rectory grounds.  
—C. S. CARTER, Louth.

*Sirex gigas* has been not uncommon in South West Yorkshire, and elsewhere this year, judging from the reports and specimens brought to me, but I have not seen *noctilio*. *S. juvenus* is distinct from both species, but most, or all, of the old records of *juvenus* refer to *noctilio*.—G. T. PORRITT.

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### MOLLUSCA.

***Milax sowerbyi* in Grimsby.**—When walking down Ainslie Street, Grimsby, about 10-30 a.m. on the 17th October, near a grass enclosure, I noticed a number of slime tracks on the pavement. From one of them I picked up a slug, which proved to be *Milax sowerbyi*. This species has not been previously recorded for the Grimsby District (Division 4).—C. S. CARTER, Louth.

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### GEOLOGY.

**Plants from the Peat.**—At a recent meeting of the Hull Geological Society it was announced by Mr. W. H. Crofts, that he had obtained a portion of a seed pod of the Iris (*I. pseudocorus*) from the peat exposed during the excavations for the dock at Immingham, North Lincolnshire. At the same meeting Mr. J. F. Robinson exhibited a well-preserved seed-pod of the March Pea (*Lathyris palustris*) from the peat exposed during the construction of the New Dock at Hull.—T. S.

**Shap Granite at Hull.**—Mr. Pauley has presented to the Hull Museum a fine Boulder of Shap Granite obtained from the Boulder Clay exposed during the construction of the new Joint Dock at Hull, at a depth of 20 ft. from the surface. It is sub-angular in shape, and measures 16 inches  $\times$  14½ inches, and is 3 ft. 8 ins. in greatest circumference.—T. S.



A contemporary figures a 'tame wild' lizard!

A certain natural history magazine is getting conscientious. We learn under 'Answers to correspondence' that 'No queries have been sent in so no replies can be published!'

We learn from the report of the Committee of the British Association appointed to determine the *precise signification* of topographical and geological terms used locally in South Africa, that Poortje=a little poort. We don't quite know what a 'little poort' is, unless it is what a geologist asks for when he is Gough (pronounced 'cope') 'a Bushman word, meaning as dry as can be.' We notice that a Yorkshire geologist is the Chairman of this Committee.

## REVIEWS AND BOOK NOTICES.

**The Green Algae of North America** is the title of an elaborate and carefully compiled memoir by Mr. Frank Shipley Collins, issued by the Tufts College, Mass. It is illustrated by numerous plates, and is a very creditable piece of work.

**The Old Cottages of Snowdonia**, by **H. Hughes** and **H. L. North**. Bangor: Jarvis & Foster. 75 pp., 3/6 net.

Most visitors to north-west Wales must have been struck with the variety and beauty, yet simplicity, of the Welsh cottages. The authors of this book have the advantage of a knowledge of architecture, and are keen draftsmen, consequently their numerous sketches of exteriors and interiors, with details of doors, etc., as well as plans of the buildings, are of permanent value. Their descriptions are charmingly written, and it is clear that they are faithful disciples of William Morris. *Simplicity* is the greatest lesson taught by the study of these cottages. The volume is in every way well produced.

**The Norfolk and Suffolk Coast**, by **W. A. Dutt**. T. Fisher Unwin. 413 pp., 6/- net.

This is one of 'The County Coast Series,' and is an admirable and charming guide to that exceptionally interesting coast between Kings Lynn and Ipswich. The author has the advantage of being personally familiar with the places about which he writes, which is an advantage! His work amongst the pre-historic and later antiquities also enables him to speak with more accuracy than usual with regard to the various relics of the ancient country with which he deals. He also refers to coast erosion, local history, natural history—in fact, practically everything than an educated visitor is likely to wish to know. The book is admirably illustrated, many of the views having been carefully selected; these alone give quite a Dickensian tone to the volume. There is a good index, and the price is very reasonable.

**Old English Towns**, by **William Andrews**. London: T. Werner Laurie. 238 pp., 6/- net.

In this the late William Andrews has written an account of the principal features in connection with twenty-seven of the old towns of this country. The exigencies of space prevent more than a very meagre summary of the history of each place; and the author has evidently given more prominence to 'curious' information than to a really sound and scholarly history of the places dealt with. He has also had no idea of proportion; the account of an old miracle play at Hull (where the author lived) taking up almost as much space as that devoted to the entire history of Leeds—a city which 'is certainly not an attractive place!' The book, however, is probably not written for the serious student, but rather to help to pass a few hours in the hands of those who like to know a little of the past history of our country, and it will serve this purpose well. It is not too technical, and the illustrations are very well chosen and well reproduced.

**The Mineral Kingdom**, by **Dr. R. Brauns**, translated, with additions, by **L. J. Spencer**. London: Williams & Norgate.

It is a pleasure to draw the attention of geologists, collectors, teachers and others to this admirable publication, which is being issued in twenty-five parts at 2/- net each, seven of which have already reached us. We hope to refer to the work again on its completion, but in the meantime we can say that it is by far the finest of its kind on the market, and it is certainly the cheapest. The coloured illustrations of minerals, usually so difficult to reproduce with any degree of accuracy, are very fine, the colours and even the metallic tints being perfect. There are to be ninety-one of these plates in the complete work, which is 4to in size, and will have 440 pages, with nearly 300 illustrations in the text. The fact that large editions have already appeared in German, Russian, Italian and Bohemian, speaks well for its popularity, and English readers are to be congratulated that the work now being issued is in the capable hands of Mr. Spencer of the British Museum. Several British minerals are figured.



**Woz's**, by **J. Carllill**. Hull: A. Brown & Sons. 118 pp., 1/- net.

We learn that 'the contents of this book is copyright'; nevertheless, it contains a number of exceedingly humorous and original stories in East Yorkshire dialect. They refer to aspects of village life, and each one has a moral. There is a useful glossary.

**The Origin of Vertebrates**, by **Walter Holbrook Gaskell**. Longmans Green & Co. 537 pp., 21/- net.

Amongst the wealth of literature now being produced under the head of 'Natural Science,' there now and then appears a volume which is a distinct and original contribution to science, which contains the honest and detailed researches of a truly qualified writer, and one which, whether the whole of the theories therein propounded are accepted or not, takes a permanent and prominent place in the great structure of Truth, which all scientific workers are, or should be, helping to erect. Such a volume was Bower's 'Origin of a Land Flora,' recently noticed in these columns. And side by side with it, and occupying a similar position, is 'The Origin of Vertebrates,' recently published. It is twenty years ago since Dr. Gaskell, as a result of his work in the physiological laboratory at Cambridge, produced the first of a lengthy series of papers dealing with this question, but these do not appear to have been either supported or condemned; in fact, criticism of the question seems to have been withheld. Dr. Gaskell therefore now brings forward his theory in a volume, and we trust that his honest and laudable desire, viz., that it shall be discussed and criticised, and any flaws in his arguments exposed, will be carried out. The matter, however, is not one which will be accepted or rejected in a short time. In the first place, the number of specialists who are qualified and able to deal with the matter fully, is not large. But unquestionably as time goes on, workers will consider the theory on its merits, and whilst we should not like to say that all Dr. Gaskell's conclusions will be accepted, he will doubtless have the satisfaction of finding that his work is appreciated, and that he has most substantially contributed towards this fascinating and important subject.

During his investigations, the author states that he could not help being struck by the force of the comparison between the central nervous systems of Vertebrata and Appendiculata as put forward again and again by the past generation of comparative anatomists, and wondered why it had been discredited. There in the infundibulum was the old œsophagus, there in the cranial segmental nerves the infraœsophageal ganglia, there in the cerebral hemispheres and optic and olfactory nerves the supra-œsophageal ganglia, there in the spinal cord the ventral chain of ganglia. But if the infundibulum was the old œsophagus, what then? The old œsophagus was continuous with and led into the cephalic stomach. What about the infundibulum? It was continuous with and led into the ventricles of the brain, and the whole thing became clear. The ventricles of the brain were the old cephalic stomach, and the canal of the spinal cord the long straight intestine which led originally to the anus, and still in the vertebrate embryo opens out into the anus. Not having been educated in a morphological laboratory, and taught that the one organ which is homologous throughout the animal kingdom is the gut, and that therefore the gut of the invertebrate ancestor must continue on as the gut of the vertebrate, the conception that the central nervous system has grown round and enclosed the original ancestral gut, and that the vertebrate has formed a new gut did not seem to him so impossible as to prevent his taking it as a working hypothesis, and seeing to what it would lead.

From this the author takes us on, step by step; each chapter being remarkably clear, and as it is followed by a concise summary, it is possible to easily grasp his meaning. His concluding remarks are:—'Throughout, from the dawn of animal life up to the present day, the evidence given in this book suggests that the same law has always held. In all cases, upward progress is associated with a development of the central nervous system. The law for the whole animal kingdom is the same as for the individual. Success in this world depends upon brains.'

Mr. Alexander Ramsey perseveres with his 'Scientific Roll and Magazine of Systematised Notes' (Bacteria), No. 24 of Vol. II. of which has recently been published. 'The Scientific Roll' is a classified bibliography as elaborate as that being conducted by the Royal Society, as detailed as that of the 'Concilium Bibliographicum' of Switzerland, and in bulk (so far as its MS. condition is concerned) greater than that of the 9th and 10th editions of the 'Encyclopædia Britannica.'

In part 35 of Cassell's excellent **Nature Book** a writer on 'Fossils and their Story' is evidently more familiar with his camera than his hammer. His first illustration is of Gryphea [sic.] incurva, 'shewing operculum,' there is a 'fossil sponge in flint chalk'; a Gault Ammonite figured as 'fossil Nautilus'; he cannot spell Hugh Miller's name correctly; Strophomena is 'a Brachiopod Shell Fish'; and Lias Limestone with gryphæas is called 'gryphite' limestone. As photographs, his illustrations are excellent.

**The Home-life of a Golden Eagle.** By H. B. Macpherson. London: Witherby & Co. 44 pp. and plates. 2/6 net.

Messrs. Witherby & Co. know how to produce an attractive book, and the reproductions of the thirty-two photographs by Mr. Macpherson, mounted on tinted paper with wide margins, certainly are all that can be desired. Judging from the plates, the author might almost have lived in a hut within a couple of yards of the eyrie, and taken repeated snap-shots from the time the eggs were laid to the flight of the young bird. We never remember seeing a more complete series of photographs of bird life—they are truly remarkable. How they were secured can be ascertained by reading the pages of letterpress. In common with most bird-photographers, Mr. Macpherson gives accounts of his dangers and escapes from death. They all escape.

**Studies in Fossil Botany,** by Dr. Dukinfield H. Scott. Second Edition. Adam and Charles Black. 1909, 683 pp., 10/6 net.

Some years since at an important conference, one of the members was missing, and was not seen for a whole day and night. The next morning it transpired that he had received Dr. Scott's 'Studies in Fossil Botany,' and had locked himself in his room in order that he might not be lured away from it. That was eight or nine years ago, and since then a whole army of workers has been contributing much useful information relating to the structure and affinities of fossil plants. Dr. Scott's 'Studies' were founded on a series of lectures delivered at the University College, London, and in their present form they embody all the discoveries since made. They are essentially concerned with the morphological and evolutionary aspects of Fossil Botany, in connection with the study of which great strides have been made in recent years. Dr. Scott's essays are illustrated by over two hundred blocks from micro-photographs and drawings; some of the latter being by Mrs. Scott. Students of this fascinating branch of palæontology are fortunate in having one so capable as Dr. Scott to present the views of recent investigations in such a readable and scholarly form. There is an excellent index, and the price of the book is very reasonable.

We regret to learn of the death of J. Ogden, the President of the Ovensden Naturalists' Society.

The report of the excursion of the Yorkshire Geological Society to Lincolnshire, which appeared in the *Yorkshire Observer* has been reprinted locally.

At the Annual Exhibition of the Royal Photographic Society of Great Britain in the New Gallery, Regent Street, W., the Yorkshire Naturalists' Union was strongly represented, the following members having had pictures accepted and hung in the Scientific Section:—R. Fortune, 5; T. Roose, 4; G. A. Booth, 3; W. Wilson, 2; J. Atkinson, 1; Digby Ledgard, 1. As about five times the number accepted are rejected each year, these gentlemen are to be congratulated upon their success.

## PROCEEDINGS OF PROVINCIAL SCIENTIFIC SOCIETIES.

The **Annual Report of the Huddersfield Natural History and Photographic Society** (1909. 8 pp.), contains a record of the year's work, together with brief natural history records by C. Mosley (Lepidoptera); E. Fisher (Ornithology); W. E. L. Wattan (Botany); and T. W. Woodhead (Geology). From the librarians' report we learn that nine books were not returned *as per rule*.

We have received the '**Birmingham Natural History and Philosophical Society** List of Members, 1909, and Annual Report for the year 1908' (Coventry, 48 pp). This is a useful record of the Society's fiftieth year's work, and of the work of its various sections. 'Expenses attending dinner in celebration of Fiftieth Anniversary, £9 5s. 1d.' would seem to indicate that 'attending dinner' is rather a serious matter in Birmingham!

The **Transactions of the Hertfordshire Natural History Society and Field Club** (Vol. XIV. pt. 1) contains a valuable series of papers on Hertfordshire geology, archaeology and natural history. The late Sir John Evans describes some palæolithic implements; Mr. Kidner has a paper on the Chalk, and there are articles on birds, insect and fungus peats, lepidoptera, soils, etc.; and the editor, Mr. John Hopkinson, has an exhaustive meteorological report. Of particular interest to northern naturalists is Canon Norman's Presidential Address on 'The Celtic Province: its Extent and its Marine Fauna.' The Editor is to be congratulated upon the excellent list of contributors. We notice the new President is a Yorkshireman, Mr. George Lamplugh, F.R.S.

**The Bradford Antiquary**, N.S., part 13. 1909. 2/6 net.

Bradford people are proverbially religious, and we naturally expect to find (and are seldom disappointed), papers dealing with old churches, chapels and parsons in antiquarian publications emanating from Bradford. The '**Bradford Antiquary**' is no exception, but in addition there are interesting articles on old Bradford and old Shipley maps, a Bradford artist (a Hull man!), place names, Cheldis, Clapham, and the Bradford Manor Court Rolls, etc. There is also an appreciative notice of the late Charles A. Federer. The contributors are Messrs. H. Speight, L. Dawson, J. A. Clapham, T. T. Empsall, H. E. Wroot, W. Scruton, B. Wood, W. E. Preston, J. H. Rowe (Editor), and Miss Tempest. This interesting publication also contains the first part of a Transcript of the Marriage Register of Bradford.

**Transactions of the Hull Scientific and Field Naturalists' Club**, Vol. IV., Part II., 1909 (pp. 55-114; plates II.-IX.). Price 2/.

This Society continues to give proof of its vitality in both the characteristics connoted in its title. This, the latest issue of its Transactions, covers the years 1907 and 1908. It is in no way inferior to the earlier numbers, and in common with them is notable for the wide field covered by the observations it records, and especially so for those in departments of Natural History which are rarely taken up by members of Natural History Societies. Articles on Palæontology, Geology, Botany, Arachnida, Mollusca, and Diatomaceæ, compete for special mention, and all deserve it. Some of them have seen the light, or been noticed in '**The Naturalist**' previously. They are none the less welcome in this collected form, showing, as they do, the sum of work done in a restricted area, partly in Yorkshire and partly in Lincolnshire. Different tastes are all catered for. The Naturalist will view with pleased surprise the excellent list of East Riding Arachnida, compiled, and for the most part collected, by Mr. Stainforth. The reader with Antiquarian or more general tastes, will be attracted to the excellent series of seven plates with full descriptive letterpress by Mr. Sheppard, of a collection of Roman and other antiquities found at South Ferriby. Those of a literary or poetic turn will be gratified to find a beautiful 'In Memoriam' sonnet over the well-known initials, 'E. L.' Emphatically a publication which entitles the members of the Hull Society to feel satisfied that real work is being done under its auspices, and should stir up other Societies to emulate the example it sets.—E. G. B.

## NEWS FROM THE MAGAZINES.

The Belfast Museum Publication, No. 19, is 'A Catalogue of Spinning Wheels and Accessories' (illustrated and sold at one penny).

A remarkable photograph of a 'Skull of the great Irish Deer' appears on page 17 of the useful *Quarterly Notes* No. 14, issued by the Belfast Museum. It is the first skull we have seen that has a distinct hybernian expression.

Mr. R. Lloyd Praeger points out (*Irish Naturalist*, November), that a specimen of *Spiranthes gemmipara* recorded in a natural history weekly, and, of course ' [properly identified.—E.K.R.] ' turns out to be not a new record, but *Epipactis palustris* !

In the *Bradford Scientific Journal* for October, there are many interesting notes. Mr. Cuthbert Hastings describes 'Gaping Ghyll'; Miss M. A. Johnstone writes on 'A Fossil Stump'; Mr. H. B. Booth describes 'the Summer Migrants'; and Mr. F. A. Lees writes on 'The Lees Herbarium and Library at Bradford.'

The *Irish Naturalist* gives the following sample from one of Uncle Westell's books :—'Creatures who are famous for their hunting powers, creatures who, possessing sharp teeth and sharp claws (known as the law or correlation, and for information upon which we are very largely indebted to the French Naturalist, Curvier), live by means of stalking and tearing to pieces their prey.'

Mr. G. T. Porritt records that of the only two specimens of *Abraxas varleyata* he bred this year, the produce of seven hundred collected pupæ, one has both the left-side wings male, *i.e.*, with the usual white rays characteristic of the sex, but the right-side wings female, *i.e.*, without white rays, as is usual in that sex. Apparently it is a gynandrous specimen. (*Entomologist*, October).

*British Birds* for November contains an account of its scheme of marking birds by means of numbered rings. During the year, 4750 rings have been issued, 2200 of which have been used. Of these, some thirteen seem to have been recovered, nearly all near the places where the birds were ringed; one being found 'dead in nest,' so had not got far. Probably better results will be reported next year.

Mr. Cuthbert Hastings has been pot-holing, and gives his experiences in a contemporary. On Great Shunner Fell, he was told of a pot hole that had *no bottom*, and another near by was *still deeper*. Investigation shewed that the deepest was under twenty-three feet. He went to investigate a cave near Grassington, which a dalesman assured him he had followed for a very long distance, and that a friend of his had gone much further. Investigation shewed that the actual distance that *could* be followed was *five yards* [sic]. We learn that a Yorkshire Anglers' Club has started pot-holing.

Mr. Edward Mitford of Hunmanby Vicarage, in *The Field*, Nov. 6th, records the shooting of a specimen of the Glossy Ibis at Hunmanby on Oct. 15th. The plumage of the head and neck indicates an immature bird. The measurement between the tips of the outstretched wings is little over 3 ft. There were two others observed at the same time, one of which was seen again. Mr. F. Boyes writes in the same journal for Nov. 13th, that he has reason to believe a Glossy Ibis frequented for a few days a wet pasture field near their river. The description was given by to him by a shooter, a reliable man, who knows most birds which frequent the river side.

# CLASSIFIED INDEX.

COMPILED BY W. E. L. WATTAM.

It is not an index in the strictest sense of that term, but it is a classified summary of the contents of the volume, arranged so as to be of assistance to active scientific investigators, the actual titles of papers not always being regarded so much as the essential nature of their contents.

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## CORRIGENDA.

- Page 162, line 29, for "Corwentz," read "Conwentz."  
 ,, 189, line 9, for "C. Stevensonii," read "Collybia Stevensonii."  
 ,, 204, line 22, for "Shipton" read "Skipton."  
 ,, 222, line 5, for "No. 1399," read "No. 1349."  
 ,, 233, line 1, for "W. Robinson," read "J. F. Robinson."  
 ,, 233, line 4, for "British Isles," read "Yorkshire."  
 ,, 253, Omit the fourth line from the bottom, and read:—  
     "This explains the scar of leaf (Fr) encircling," etc.  
 ,, 268, line 39, for "Bale," read "Belt."  
 ,, 339, line 46, for "vertical," read "vortical."  
 ,, 346, line 20, for "Limestone," read "Grit."  
 ,, 360, line 3, for "1908," read "1909."  
 ,, 401, line 26, for "Brimscar," read "Grimscar."  
 ,, 401, line 30, for "banded," read "handed."  
 ,, 443, line 19, for "pseudocorus," read "pseudacorus."  
 ,, 443, line 23, for "Lathyris" read "Lathyrus."

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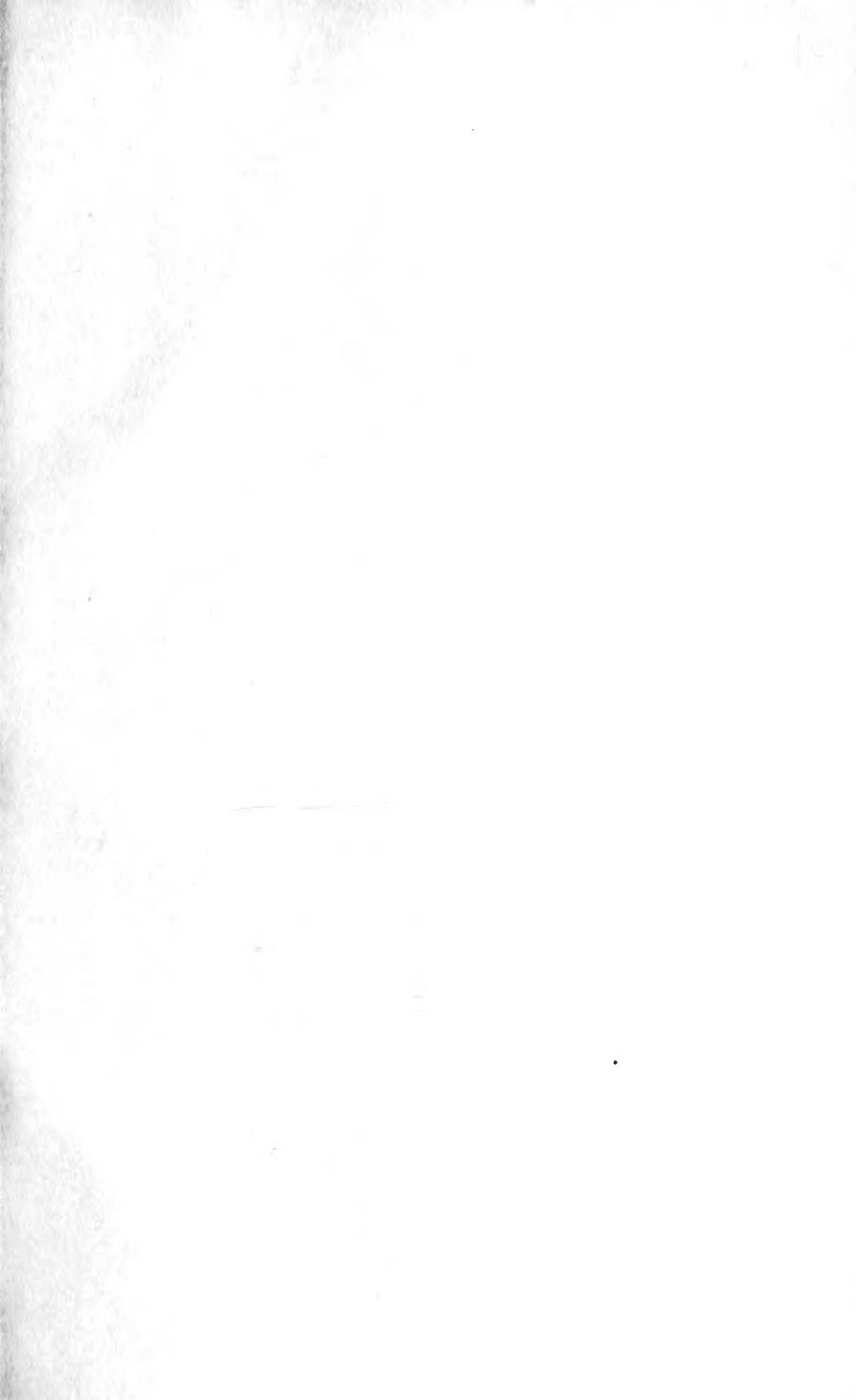
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